0045467

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003 OAK RIDGE, TENNESSEE 37831-7440 February 24, 1992

Ms. Joan Kessner Westinghouse Hanford Company Office of Sample Management 2355 Stevens Drive Richland, Washington, 99352

Dear Ms. Kessner:

Wet Chemistry Analytical Results Package on Project 91-020: 200-BP-1 Samples

Attached are the analytical results of the wet chemistry analysis on the 200-BP-1 samples, SDG# BOOJ75, Project 91-020, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on April 6, 1991. Also attached are copies of the AnaLis report forms, the Chain of Custody records and sample receipt documentation, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported on CLP-type forms for the wet chemistry analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than the conditions detailed in the following forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Sincerely,

Deborah L. Amburgey

Program Manager

Hanford Support Program

Clarence R. Kirkpatrick

Program Manager

Waste Management Analysis

Roy W. Morrow Department Manager

K-25 Site Analytical Chemistry Department

Attachments

cc/attach: D.L.Amburgev

S.R.Smith - RC

cc: H.H.Sullivan

PROTOCOL UTILIZED FOR WET CHEMISTRY ANALYSES OF 200-BP-1 SAMPLES

A. Anions (NO₃, SO₄, Ortho Phosphate)

Protocol
EPA-300.0

SAMPLE IDENTIFICATION TABLE FOR SDG# BOOJ75

200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
4/06/91	ВООЈ75	910412-211	soil	
	BOOJ76	910412-212	soil	
	BOOJ75-MS	910415-089	soil	Matrix spike of BOOJ75 (910412-211)
	BOOJ75-MSD	910415-090	soil	Matrix spike duplicate of BOOJ75 (910412-211)

Date: $4-6-91$ Shipper ID and I	Document No: 2474256686							
Cooler ID if noted on outside of cooler: EACIR								
Project No: 6132 Subproject No: 02	O Site Location: Hanford							
!	•							
Custody seal on cooler? Yes No	Custody seals dated and signed? Yes No							
Condition of cooler acceptable? Yes No	Prog. Mgr. notified of receipt of cooler? Yes No							
Radioactive labels? Yes Wo	Radioactivity recheck OK? Yes No							
Hazardous labels? Yes Wo	Samples properly labeled? Yes No							
Custody form(s) inside of cooler? Yes No	Custody form(s) properly completed and signed? Yes No							
Was cooler required to be maintained at 4 deg C? Yes No	Thermometer inside of cooler? Yes No							
Sample containers intact? Yes No	Temperature of cooler: /5 deg C (X.X)							
Are containers those specified for requested parameters? Yes No	VOA containers free of bubbles? NA Yes No							
Date of login:	Additional information needed from Prog. Mgr.? Yes No							
Lab assigned ID No:								
Thru	NOTE: Nitrite-N, Nitrate-N, o-Phosphate- o-Phosphate-P have 48-hour holding time. LOG IN THESE FIRST - ASAP							
The lab numbers plus the project numbers	per are used for tracking purposes.							
Comments:	Signed: J.Danson							

Custody seals not initialed and dated.

Custody form not signed.

Bothes not labeled for analyses.

Need chrification on number of containers for 1800s' 800s76.



MARTIN MARIETTA ENERGY SYSTEMS, INC.

CHAIN OF CUSTODY RECORD

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Company Contact Ron Mitche	//	Telephone <i>376-5133</i>
Project Designation/Sampling Location	as _300 BP-1	Collection Date 4/1/91
	npling Project #91-020	
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#### Date Printed: 10-FEB-1992 14:20

#### Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

AnaLIS ID: 910412-211

Project: G132 0201

Customer Sample ID: BOOJ75

Customer: KESSNER

Requisition Number:

Date Sampled: 1-APR-1991

Sampled By:

Date Sample Received: 6-APR-1991

Date Sample Completed: 24-SEP-1991

Material Description: SOIL

Date Sample Approved:

[]: Result has been Corrected for Spike Program Manager: DL AMBURGEY (# 28912

Procedure No.	Analysis	Result	Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Spectr	ochemistry Laboratory ***** Selenium	< 0.4	41		ug/Kg	29175	10427A	27-JUN-19
**** Induct	ively Coupled Plasma Laboratory	, ****						
EPA-3050	Bismuth	<10.0	)		mg/Kg	EA HESTER	10716В	16-JUL-19
EPA-200.7								
**** Radioc	hemistry Laboratory *****							
EC-134	Cesium-137	2.93	3	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
EPA-900.0	Alpha Activity	1.26	5	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-900.0	Beta Activity	5.97	7	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-906.0	Strontium	1.31	1	+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-19
IHA-485	Uranium Alpha Activity	3.66E-1	1	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-15
TP-1628	Technetium	-1.54	4	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-238	2.58E-2	2	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-15
TP-1635	Plutonium-239	-2.58E-2	2	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
**** Wet Ch	emistry Laboratory ****							
EPA-300.0	Nitrate	<20	)		ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Ortho Phosphate IC	<20	ם		ug/g	CA SEDLACEK	91-44 IA	21-APR-10
EPA-300.0	Sulfate	<20	0		ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-335.2	Cyanide	<0.	1		ug/g	900019	91-29	20-MAY-19

#### Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
NITRATE	0	100	99	ug/g	99.	99.0
ORTHO PHOSPHATE IC	0	100	88	ug/g	88.	88.0
SHI FATE	n	200	176	ua/a	176	88.0

AnaLIS ID: 910412-212

1-APR-1991

Project: G132 0201

Customer Sample ID: 800J76

Customer: KESSNER

Requisition Number:

Date Sampled:

Date Sample Received:

Date Sample Completed: 24-SEP-1991

6-APR-1991

Sampled By: Material Description: SOIL

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
***** Spectro	ochemistry Laboratory *****	<0.42					
	Selenium			ug/Kg	29175	10427A	27-JUN-199
**** Inducti	ively Coupled Plasma Laboratory	****					
EPA-3050	Bismuth	<10.0		mg/Kg	EA HESTER	10716B	16-JUL-199
EPA-200.7							
***** Radioch	nemistry Laboratory ****						
EC-134	Cesium-137	20.22	+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
EPA-900.0	Alpha Activity	3.27	+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-900.0	Beta Activity	27.80	+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-906.0	Strontium	2.65	+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-199
IHA-485	Uranium Alpha Activity	4.45E-1	+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-199
TP-1628	Technetium	48.10	+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-238	0.00	+/- 1.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-239	-2.58E-2	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
**** Wet Che	emistry Laboratory *****					-	
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-335.2	Cyanide	<0.1		ug/g	900019	91 <b>-29</b>	20-MAY-199

#### Date Printed: 10-FEB-1992 14:23

#### Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

AnalIS ID: 910415-089 Customer: KESSNER

Project: G132 0201

Customer Sample ID: BOOJ75-MS

Date Sampled: 1-APR-1991

Requisition Number:

Date Sample Received: 6-APR-1991

Sampled By:

Date Sample Completed:

Material Description: SOIL

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[]: Result has been Corrected for Spike

Procedure No.	Analysis	Result Q Qua	Limit l of Error	Units	Analyst —	QA File Number	Date Completed
**** Spectr	ochemistry Laboratory ***** Selenium	N/A		ug/Kg			
**** Induct	rively Coupled Plasma Laboratory	, ****					
EPA-200.7(CLF	) Bismuth	NA		ug/Kg	MJ SCHEUER	NA	16-JUL-199
**** Radio	chemistry Laboratory ****						
EC-134	Cesium-137	NA	+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-194
EPA-900.0	Alpha Activity	1.40E3	+/- 27.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-900.0	Beta Activity	1.79E3	+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19 ^c
EPA-906.0	Strontium	2.13E4	+/- 35.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-194
IHA-485	Uranium Alpha Activity	35.50	+/- 1.9	pCi/g	SM KINNEBREW	ENV-534	28-APR-199
TP-1628	Technetium	3.37E2	+/- 21.7	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-238	1.35E-1	+/- 1.4E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-239	11.00	+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-194
**** Wet Cl	semistry Laboratory ****						
EPA-300.0	Nitrate	88		ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Ortho Phosphate IC	99		ug/g	CA SEDLAČEK	91-44 IA	21-APR-19.
EPA-300.0	Sulfate	176		ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-335.2	Cyanide			ug/g	MH FELLER	Χ .	21-APR-19

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PREFORMED ON CYANIDE ANALYSIS

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

#### Date Printed: 10-FEB-1992 14:2

#### Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Analis ID: 910415-090

Project: G132 0201

Customer Sample ID: BOOJ75-MSD

Customer: KESSNER

Program Manager: DL AMBURGEY (# 28912

Requisition Number:

Date Sampled: 1-APR-1991 Date Sample Received: 6-APR-1991

Date Sample Completed:

Sampled By:

Material Description: SOIL

Date Sample Approved:

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result Q Qua	Limit al of Error	Units	Analyst"	QA File Number	Date Completed
***** Spectr	ochemistry Laboratory ***** Selenium	N/A		ug/Kg			•
**** Induct	ively Coupled Plasma Laboratory	****					
EPA-200.7(CLP	) Bismuth	NA		ug/Kg	MJ SCHEUER	NA	16-JUL-19
**** Radioc	hemistry Laboratory *****						
EC-134	Cesium-137	NA	+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
EPA-900.0	Alpha Activity	1.52E3	+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-19
EPA-900.0	Beta Activity	1.84E3	+/- 29.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-15
EPA-906.0	Strontium	1.82E4	+/- 33.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-19
IHA-485	Uranium Alpha Activity	37.90	+/- 2.1	pCi/g	SM KINNEBREW	ENV-534	28-APR-19
TP-1628	Technetium	3.27E2	+/- 21.5	pCi/g	SM KINNEBREW	ENV-534	6-JUN-15
TP-1635	Plutonium-238	1.73E-1	+/- 1.5E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-19
TP-1635	Plutonium-239	11.20	+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-15
**** Wet Ch	emistry Laboratory *****						
EPA-300.0	Nîtrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-15
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-19
EPA-335.2	Cyanide	x		ug/g	MH FELLËR	x	21-APR-14

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PERFORMED ON CYANIDE ANALYSIS

***** Comments from the Radiochemistry Laboratory *****

THE SPIKE RECOVERY ON SAMPLE NUMBERS 910145-089MS, 090MSD FOR PLUTONIUM WAS BASED ON THE TOTAL OF PU-238 AND PU-239. ***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

#### MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003 OAK RIDGE, TENNESSEE 37831-7440

February 24, 1992

Ms. Joan Kessner Westinghouse Hanford Company Office of Sample Management 2355 Stevens Drive Richland, Washington, 99352

Dear Ms. Kessner:

#### Inorganic Analysis CLP Package on Project 91-020: 200-BP-1 Samples

Attached are the results of the inorganic analyses on the 200-BP-1 samples, SDG# BOOJ75, Project 91-020, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on April 6, 1992. Also attached are copies of the Chain of Custody records and sample receipt documentation, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported in CLP format for the inorganic analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than any conditions detailed in the forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Sincerely,

Deborah L. Amburgey

Program Manager

Hanford Support Program

Clarence R. Kirkpatrick

Program Manager

Waste Management Analysis

Roy W. Morrow
Department Mana

Department Manager

K-25 Site Analytical Chemistry Department

Attachments

cc/attach: D. L. Amburgey

S. R. Smith - RC

cc:

N. P. Buddin

D. C. Canada

H. H. Sullivan

### PROTOCOL UTILIZED FOR INORGANIC ANALYSES OF

#### 200-BP-1 SAMPLES

A. ICP Metals (Bismuth only)

Protocol
EPA-200.7

B. AA Metals

Selenium EPA-270.2 C. Cyanide EPA-335.2

#### SAMPLE IDENTIFICATION TABLE FOR SDG# BOOJ75

#### 200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
4/06/91	ВООЈ75	910412-211	soil	
	воој76	910412-212	soil	
	BOOJ75-MS	910415-089	soil	Matrix spike of BOOJ75 (910412-211)
	BOOJ75-MSD	910415-090	soil	Matrix spike duplicate of BOOJ75 (910412-211)

July 29, 1991

Between March 31, 1991 and April 6, 1991 the K-25 (ORK25P) Analytical Chemistry Department received the following samples for analysis:

Laboratory ID	EPA ID	Customer No.:
910403-102	BOOFH5	BOOFH5
910403-103	BOOFH6	BOOFH6
910408-029	BOOF94	BOOF94
910408-030	BOOF95	BOOF95
910412-211	BOOJ75	BOOJ75
910412-212	BOOJ76	BOOJ76

The above samples were designated as ICP, SDG number BOOFH5. The Laboratory ID and Customer Sample Numbers are used internally for tracking purposes.

The following quality control solutions were used for the analysis of these samples:

ICP calibration verifications	SPEX Multielement Standards (SPEX7, SPEX19)
ICP interference check standards	EPA UNLV-QAL ICS-A(1089) and ICS-B(1089)
ICP aqueous laboratory control std	EPA UNLV-QAL Std.(0287)
ICP CRDL standard	Perkin Elmer Multielement CRDL Standard Mix

ICP Calibration Standards

- a. STD1 = Matrix Matched Standard Blank
- b. STD2 = SPEX Multielement Standard (XORNL22)
- c. STD3 = SPEX Multielement Standard (XORNL18)
- d. STD4 = SPEX Multielement Standard (XORNL19, XORNL20)
- e. STD5 = SPEX Multielement Standard (XORNL24)
- f. STD6 = SPEX Multielement Standard (XORNL25)
- g. STD7 = SPEX Multielement Standard (XORNL26)
- h. STD8 = SPEX Single Element 1000 ppm Ag

All associated QA/QC was within the criteria specified by CLP.

Sincerely

M.J. Scheuer

cc:

M.S. Dill

R.W. Morrow

File - MJS - NoRC

This data has been reviewed and is approved for release.

R.W. Morrow, Dept. Head

M.S. Dill, Methodology and QA

100

Joan Kessner Project Manager Westinghouse Hanford Company Richland, WA 99336

Dear Ms. Kessner,

On April 6, 1991 the Oak Ridge K-25 Site Analytical Chemistry Department (ACD) received 2 soil samples from Westinghouse Hanford Company. The samples were grouped into a Sample Delivery Group following EPA CLP protocols. The K-25 sample identification numbers were assigned as follows:

Laboratory ID	Customer ID	EPA Sample Number	
910412-211	воој75	BOOJ75	
910412-212	BOOJ76	BOOJ76	

A narrative of the Atomic Spectrometry and Mercury Analysis laboratories experiences and problems in the preparation and analysis of the sample is given below:

The pre-digest spike and both analytical spikes did not recover within the allowable QC limits and are flagged with the appropriate CLP data qualifier flags. The low concentration of selenium found in the samples did not warrent the use of standard additions for quantification, however the analytical spike data shows appreciable interferences present in the samples. No other unusual problems were encountered with this sample set.

The following quality control solutions were used for the analysis of these materials:

GFAAS initial calibration verification
GFAAS continuing calibration verification

EPA ICV-2 (0590)

Perkin-Elmer CLP standard N930-0221

All values on all forms have been rounded to the appropriate number of significant figures in accordance with the 3/90 revision of the EPA CLP statement of work, SOW ILM01.0. All data qualifier flags, C and Q field, are consistent with requirements of the SOW. All calculated results shown on forms are derived from the rounded values given on the forms, not from the original raw data.

Sincerely,

Thomas J. Oatts

cc:

D. C. Canada R. W. Morrow

File - TJO - NoRC

This data has been reviewed and is approved for release.

R. W. Morrow, Dept. Head

D. C. Canada, Methodology and QC

#### ENVIROFORMS/CLP 788

SAMPLE NO.

BOOJ75

#### INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

B∞J 15

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): SOIL

Lab Sample ID: 910412-211

Level (low/med): LOW

Date Received: 04/06/91

% Solids:

97.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	С	Q	м
			-		NR
					NR NR NR NR P
			<u> </u>		NR
·	\ <u>-</u>		<u> </u>	<u> </u>	NR
	Bismuth	10.2	<u>U</u>	<u>N</u>	[분]
			_		NR
			-	<del></del>	NR NR NR NR NR NR NR NR NR
\ <del></del>			-		NB
			-		NR
			-		NR
			-		NR
					NR
					NR
			<u> </u> _	ļ <u>.</u>	NR
			_	<b> </b>	$\frac{NR}{NR}$
			<b> </b>		
			-	<del></del>	NK N
	<b></b>		-	<u> </u>	NR NR NR NR NR
<u> </u>			-		NR

Color Before: BROWN

Clarity Before: CLEAR

Texture:

Color After: LT. GREEN Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910412-211

# INORGANIC ANALYSES DATA SHEET

EPA	SAMPLE	NO.
-----	--------	-----

			B00J75
Lab Name: MARTIN_MAR	IETTA_K25_SITE_	Contract: HANFORD	! <u> </u>
Lab Çode: K25ACD	Case No.:		SDG No.: BOOJ75
Matrix (soil/water):	SOIL_	Lab Sampl	e ID: 910412-211
Level (low/med):	LOW	Date Rece	ived: 04/06/91
% Solids:	97.5		

Concentration Units (ug/L or mg/kg dry weight): MG/KG

, <del></del>					· i
CAS No.	Analyte	Concentration	С	Q	м
7429-90-5	Aluminum		-		NR
7440-36-0	Antimony_		-		NR
7440-38-2	Arsenic		-		NR
7440-39-3	Barium		-	<del></del>	NR
7440-41-7	Beryllium		-		NR
7440-43-9	Cadmium		-		NR
7440-70-2	Calcium				NR
7440-47-3	Chromium		-		NR
7440-48-4	Cobalt		-		NR
7440-50-8	Copper		-		NR
7439-89-6	Iron		-		NR
7439-92-1	Lead				NR
7439-95-4	Magnesium		-		NR
7439-96-5	Manganese		1-		NR
7439-97-6	Mercury				NR
7440-02-0	Nickel -		-		NR
7440-09-7	Potassium		-		NR
7782-49-2	Selenium	0.41	ו ש	WN	F
7440-22-4	Silver				NR
7440-23-5	Sodium			-	NR
7440-28-0	Thallium	· · · · · · · · · · · · · · · · · · ·	-	-	NR
7440-62-2	Vanadium		-	_	NR
7440-66-6	Zinc		_		NR
	Cyanide		-		NR
					<b> </b>

Color Before:	BROWN	Clarity	Before:		Texture:	COARS
Color After:	BROWN	Clarity	After:	<del></del>	Artifacts:	YES
Comments: ROCKS		**	····			

### U.S. EPA - CLP

	_		1		EPA SAMPLE NO.
			NALYSIS DATA S	HEET	B00J15
Lab Name: _	Martin Mariet	tc	Contract: _		1 000 3 7 3
Lab Code: _	<u> Ка5</u> са	se No.:	SAS No.	:	SDG No.: B0077:
Matrix (soi	1/water): <u>Soi</u>	<u> </u>			e ID: 9/04/2.21/
Level (low/	med):			Date Rece	ived: 4/6/91
<pre>\$ Solids:</pre>	97.	<del></del>		=	1
	Concentration	Units (ug/	L or mg/kg dry	weight):	mg/kg.
	•		<u> </u>	1 1	_
	CAS No.	Analyte	Concentration	ici o	W i
	7429-90-5	Aluminum	t	· <b>!</b> !	<del></del> }
<del>=</del>	7440-36-0	· · · · · · · · · · · · · · · · · · ·		<b>: </b>	
	7440-38-2		<u> </u>		— <u> </u>
	7440-39-3	·	İ	i - i i	<u> </u>
	7440-41-7	Beryllium		<u> </u>	<u> </u>
	7440-43-9		1	.	1
	7440 <del>-</del> 70-2	•	<u> </u>	.	[
	7440-47-3		<u> </u>	.	
	7440-48-4		<u> </u>	.	!
	7440-50-8		<u> </u>	.!!!	!
	7439-89-6		<u> </u>	.	!
	7439-92-1  7439-95-4	Magnesium	ļ——————	·┆╼╌╏╼╌═╼╼╌┈┆	
		Manganese		╏╌╏╌┈┈┈┤	<b></b> ¦
	17439-97-6	· ·		·¦¦	<del></del>
	7440-02-0	Nickel	İ	.	
2		Potassium	·	·¦¦	<b></b> ¦
		Selenium		-{	<b>-</b> -
	7440-22-4			-	
	7440-23-5	' .			<b>-</b>
=	7440-28-0	Thallium		i-ii	<u>-</u>
	7440-62-2	Vanadium		i	<u> </u>
	7440-66-6			<u> </u>	<u> Ti</u>
	1	Cyanide	< 0.1	1_11	<u></u> 1
		_		_	!
Color Befor	re:	Clari	ty Before:		Texture:
Color After	r:	Clari	ty_After:	<del></del>	Artifacts:
Comments:					

#### ENVIROFORMS/CLP 788

# INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

**BOOJ76** 

Lab Code: K25

% Solids:

Case No.:

SAS No.:

SDG No.: BOOF45

Matrix (soil/water): SOIL

Lab Sample ID: 910412-212

Date Received: 04/06/91

Level (low/med):

TOM 94.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

		\$ m m			$\Box$
CAS No.	Analyte	Concentration	C	Q	М
			_		<u> </u>
		· .	<b> </b> _		NR.
	.	-	_		NR NR
			-		WK
<del></del>	72		<u> </u>	<del></del>	
	Bismuth	10.0_	브	<u>N</u>	NTD.
	.	-			ME
	·	_ \	-	<del></del>	MD
····			-		NR
			-		NR
<del></del>		-	-		NR
		<b>₹</b> . □	-		NR
			-		NR
					NR
		_	<b> </b> _		NR
l	.		l_		<u>NR</u>
			<u> </u>		NR NR
			_		NR
	.		<b> </b> _		NR NR NR
ļ	.	_	_		NR
l	.l	_	<u> </u>		<u>NR</u>

Color Before: BROWN

Clarity Before: CLEAR Texture:

Color After: LT. GREEN

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910412-212

INORGANIC ANALYSES DATA SHEET

EPA	SAMPLE	NO.

Lab Name: MARTIN_MAR	ETTA_K25_SITE_	: Contract: HANFORD	BOOJ76
Lab Code: K25ACD	Case No.:	SAS No.:	SDG No.: BOOJ75
Matrix (soil/water):	SOIL_	Lab Sampl	e ĪD: 910412-212
Level (low/med):	LOW	Date Rece	ived: 04/06/91
e colida.	94 9		

% Solids: _94.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

7440-36-0 Antimony 7440-38-2 Arsenic 7440-39-3 Barium 7440-41-7 Beryllium 7440-43-9 Cadmium 7440-47-3 Chromium 7440-48-4 Cobalt 7440-50-8 Copper 7439-92-1 Lead 7439-95-4 Magnesium 7439-96-5 Manganese 7440-02-0 Nickel 7440-09-7 Potassium 7782-49-2 Selenium 77440-23-5 Sodium 77440-28-0 Thallium 77440-66-6 Zinc 77440-66-6		T				
7440-36-0       Antimony       NR         7440-38-2       Arsenic       NR         7440-39-3       Barium       NR         7440-41-7       Beryllium       NR         7440-43-9       Cadmium       NR         7440-47-3       Chromium       NR         7440-48-4       Cobalt       NR         7449-89-6       Iron       NR         7439-92-1       Lead       NR         7439-95-4       Magnesium       NR         7439-96-5       Manganese       NR         7440-02-0       Nickel       NR         7440-09-7       Potassium       NR         7440-22-4       Silver       NR         7440-28-0       Thallium       NR         7440-62-2       Vanadium       NR         7440-66-6       Zinc       NR	CAS No.	Analyte	Concentration	С	Q	м
7440-36-0 Antimony 7440-38-2 Arsenic 7440-39-3 Barium 7440-41-7 Beryllium 7440-43-9 Cadmium 7440-47-3 Chromium 7440-48-4 Cobalt 7440-50-8 Copper 7439-92-1 Lead 7439-95-4 Magnesium 7439-96-5 Manganese 7440-02-0 Nickel 7440-02-0 Nickel 7440-22-4 Silver 7440-23-5 Sodium 7440-28-0 Thallium 7440-66-6 Zinc	7429-90-5	Aluminum		-		NR
7440-38-2         Arsenic         NR           7440-39-3         Barium         NR           7440-41-7         Beryllium         NR           7440-43-9         Cadmium         NR           7440-70-2         Calcium         NR           7440-48-4         Cobalt         NR           7449-89-6         Iron         NR           7439-92-1         Lead         NR           7439-95-4         Magnesium         NR           7439-96-5         Manganese         NR           7440-02-0         Nickel         NR           7440-02-0         Nickel         NR           7440-22-4         Silver         NR           7440-23-5         Sodium         NR           7440-28-0         Thallium         NR           7440-66-6         Zinc         NR	7440-36-0	Antimonv_		_	-	NR
7440-39-3         Barium         NR           7440-41-7         Beryllium         NR           7440-43-9         Cadmium         NR           7440-70-2         Calcium         NR           7440-47-3         Chromium         NR           7440-48-4         Cobalt         NR           7439-89-6         Iron         NR           7439-92-1         Lead         NR           7439-95-4         Magnesium         NR           7439-96-5         Manganese         NR           7440-02-0         Nickel         NR           7440-02-1         Potassium         NR           7440-22-4         Silver         NR           7440-23-5         Sodium         NR           7440-28-0         Thallium         NR           7440-66-6         Zinc         NR	7440-38-2					NR
7440-41-7   Beryllium	7440-39-3					NR
7440-43-9       Cadmium       NR         7440-70-2       Calcium       NR         7440-47-3       Chromium       NR         7440-48-4       Cobalt       NR         7440-50-8       Copper       NR         7439-89-6       Iron       NR         7439-95-4       Magnesium       NR         7439-96-5       Manganese       NR         7440-02-0       Nickel       NR         7440-09-7       Potassium       NR         7440-22-4       Silver       NR         7440-23-5       Sodium       NR         7440-66-6       Zinc       NR	7440-41-7		<del></del>	-		NR
7440-70-2	7440-43-9	1		-		NR
7440-47-3	7440-70-2	Calcium	· — · · · · · · · · · · · · · · · · · ·	-	- <del></del>	NR
7440-48-4   Cobalt   Copper   NR   NR   7439-89-6   Iron   NR   NR   NR   7439-92-1   Lead   NR   NR   7439-95-4   Magnesium   NR   NR   7439-96-5   Manganese   NR   7440-02-0   Nickel   NR   7440-02-0   Nickel   NR   7782-49-2   Selenium   O.42   U   WN   F   7440-23-5   Sodium   NR   7440-28-0   Thallium   NR   7440-66-6   Zinc   NR   NR   NR   7440-66-6   Zinc   NR   NR   NR   NR   NR   NR   NR   7440-66-6   Zinc   NR   NR   NR   NR   NR   NR   NR   N	t ·			-		NR
7440-50-8   Copper	7440-48-4	Cobalt		-		NR
7439-89-6	7440-50-8			-	·	NR
7439-92-1 Lead 7439-95-4 Magnesium 7439-96-5 Manganese 7439-97-6 Mercury 7440-02-0 Nickel 7440-09-7 Potassium 7782-49-2 Selenium 7440-23-5 Sodium 7440-28-0 Thallium 7440-66-6 Zinc NR NR NR NR NR NR NR NR NR NR NR	7439-89-6			-		NR
7439-96-5 Manganese	7439-92-1	Lead	<del></del>	\ <del></del>		NR
7439-97-6 Mercury 7440-02-0 Nickel 7440-09-7 Potassium 7782-49-2 Selenium 7440-22-4 Silver 7440-23-5 Sodium 7440-28-0 Thallium 7440-66-6 Zinc NR	7439-95-4	Magnesium		-	-	NR.
7439-97-6 Mercury 7440-02-0 Nickel 7440-09-7 Potassium 7782-49-2 Selenium 7440-22-4 Silver 7440-23-5 Sodium 7440-28-0 Thallium 7440-66-6 Zinc NR	7439-96-5	_		_		NR
7440-02-0   Nickel	7439-97-6					NR.
7782-49-2 Selenium 0.42 U WN F 7440-22-4 Silver NR 7440-23-5 Sodium NR 7440-28-0 Thallium NR 7440-66-6 Zinc NR	7440-02-0					NR
7440-22-4 Silver NR 7440-23-5 Sodium NR 7440-28-0 Thallium NR 7440-62-2 Vanadium NR 7440-66-6 Zinc NR	7440-09-7	Potassium		-	*	$ _{NR}$
7440-22-4 Silver NR 7440-23-5 Sodium NR 7440-28-0 Thallium NR 7440-62-2 Vanadium NR 7440-66-6 Zinc NR	7782-49-2	Selenium	0.42	ו ט	WN	F
7440-28-0 Thallium	7440-22-4	****				NR
7440-62-2   Vanadium	7440-23-5	Sodium		-		NR
7440-62-2   Vanadium	7440-28-0	Thallium		\\		NR
7440-66-6 ZincNR	7440-62-2					NR
Cyanide NR	7440-66-6	<b>-</b>		-		NR.
	Ì	Cyanide		-		NR
		<u> </u>		-		

Color Before:	BROWN	Clarity Before:	Texture: COARSI
Color After:	BROWN	Clarity After:	Artifacts: YES
Comments: ROCKS			

	I	NORGANIC A	l Nalysis data s	HEET	EPA SAMPLE NO.
Lab Name: Mart	in Marie	Ha	Contract: _	-	B00776
Lab Code: K25	_ Cas	ie No.:	SAS No.	:	SDG No.: 800375
Matrix (soil/wat	ter): Soi	1		Lab Sampl	le ID: 9/04/2, 2/2
	101				eived: 4/6/91
Level (low/med)	· <u> </u>	<del></del>		Date Kece	erved: 1/6///
% Solids:	94.0	<del>/</del>			
Conc	entration	Units (ug/	L or mg/kg dry	y weight):	mg/Ks.
Į Į	CAS No.	Analyte	Concentration	  C  Q	   M
<u> </u>	7429-90-5	Aluminum		. -	
ı	7440-36-0	_			
•	7440-38-2			i_i	i <u></u> i
		Barium		.	!!
	7440-41-7			. _	<u> </u>
	7440-43-9 7440-70-2			-	<del>                                     </del>
•		Chromium		-	<u> </u>
•	7440-48-4			-	<b>{</b> }
•	-	Copper			<del>                                     </del>
•	7439-89-6	Iron			<u> </u>
•		Lead  Magnesium	ļ	- -	<del>  </del>
•		Manganese		-	<b>¦</b> ¦
		Mercury			i l
į	7440-02-0	Nickel			i <u> </u>
!		Potassium		i _ i	
ļ		Selenium_		-!!	!!
1		Silver  Sodium	<u> </u>	-	<b>!</b> !
	7440-28-0	Thallium	i ————	-	·{
İ	7440-62-2				<b>;;─</b> ;
į	7440-66-6	Zinc			
Ĭ		Cyanide_	<0.1	- -	
Į.			.1	_!!,	.11
Color Before: _		Clari	ty Before:		Texture:
Color After: _		Clari	ty After:	<del></del>	Artifacts:
Comments:					
				-	

#### COOLER RECEIPT FORM for SOP 2332

Date: $4-6-91$ Shipper ID and	Document No: 2474256686						
Cooler ID if noted on outside of cool	er: <u>EAOIZ</u>						
Project No: <u>G13</u> Subproject No: <u>o2</u>	Site Location: Hanford						
!	•						
Custody seal on cooler? Yes No	Custody seals dated and signed? Yes No						
Condition of cooler acceptable? Yes	Prog. Mgr. notified of receipt of cooler?  Yes No						
Radioactive labels? Yes	Radioactivity recheck OK? Yes No						
Hazardous labels? Yes Wo	Samples properly labeled? Yes No						
Custody form(s) inside of cooler? Yes No	Custody form(s) properly completed and signed?  Yes No						
Was cooler required to be maintained at 4 deg C? Yes No	Thermometer inside of cooler? Yes No						
Sample containers intact? (Yes) No	Temperature of cooler: /5 deg C (X.X)						
Are containers those specified for requested parameters? Yes No	VOA containers free of bubbles?						
Date of login:	Additional information   Yes No						
Lab assigned ID No:							
Thru	NOTE: Nitrite-N, Nitrate-N, o-Phosphate- o-Phosphate-P have 48-hour holding time. LOG IN THESE FIRST - ASAP						
The lab numbers plus the project numbers	per are used for tracking purposes.						
Comments:	Signed: J.Danson						
Custody seals not initialed and dated.							
Custody form not signed.							
Bottles not labeled for analyses.							
Need chrification on number of containers for 1300175							

BOO 376.



#### MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

**ANALYTICAL CHEMISTRY DEPARTMENT** 

## **CHAIN OF CUSTODY RECORD**

S. stage.

OF CUSTODY RECORD

ACD/COC NO 1782

PROJECT NUMBER F	PROJECT NAME-				1	<u> </u>		7	7_	J-	70	×/ /
91-020	200-BP-1, -	Task 3					\$	)/	100	/主		
SAMPLERS (SIGNATURE)					NO. OF		100	( 01/	7	$V_{\overline{\Sigma}}$	he	A DEMARKS
		<b>.</b>			CON- TAINERS		\Q	anid	meth	WILL TO	J	REMARKS
CUSTOMER NUMBER	ACD NUMBER	SAMI	PLING	SAMPLE	TAIREIS	,	5/2/2			2 16		
		DATE	TIME	TYPE		4		$\mathcal{Z}$	) V)	II	_	
Bool 75	910412-211	4/1/91		Soil		1	V		/	1		Nitrate Phosphate Sulfate
BOOJ 16	-212					1/	V	:/	/	/		2 Total Alpha, Total Beta, TC-99, 5r-90
												'Nitrate, Phosphate, Sulfate  2 Total Alpha, Total Beta, TC-99, 5r-90 C5-131, Co-60, Pu-336, Pu-239/240
(BO) 575-MS	910415-089											Total U
(BOS75-MSD)	-090					<u> </u>						
•												
												·
			•									
7												
							, iii					
RELINQUISHED BY (Signatur	e) Date Tim	RECEIVED	BY (Signatur	e)	Date	Ť	me	RELIN	iQUIS	HED	BY (	(Signature) Date Time RECEIVED BY (Signature)
RELINQUISHED BY (Signature	e) Date Tim	A PECELVED	BY (Signatur		4-6-9/ Date	/3		DEL IN	ioniisi	HED	RY- /	(Signature) Date Time RECEIVED BY (Signature)
RELINCUISHED BY (Signature	e) Date IIM	IS MECEIVED	or (oignalui	e)	Vale	"	1116	1111 L. I.I.V	÷4013		J. (	[Digitalians]
		1			<u> </u>	<u> </u>						

Westinghouse Hanford Company	CHAI	N OF CUSTODY	128
Custody Form Initiator <u>C.E. Heiden</u>		#	
Company Contact Ron Mitchell		Telephone <i>370</i>	-5133
Project Designation/Sampling Locations _	•	Collection Date 4//	
Near Gurface Soil Samp	ling Project #91-020		
Ice Chest No. EAD12		Field Logbook No	
Bill of Lading/Airbill No. 3474350			
Method of Shipment Emery		. , -	
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Possible Sample Hazards/Remarks N	799		
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☐ Field Transfer of Custody	CHAIN OF POSSESSION	(Sign and	Print Names)
Relinquished by:	deceived by: J DEMAREST	Date/Time:	
C.E. Heiden	amust	4-4-91 1	1.50A
Relinquished by: J. DemAREST F	leceived by: J. Gadson	Date/Time:	
() Umaust	J.Darzon		/ <u>3/5</u>
Relingiaished by:	Received by:	Date/Time:	
Relinquished by:	Possings but	Date/Time:	•.
Reiniquistied by.	Received by:	Date/Time.	
	Final Sample Disposition		<del></del>
Disposal Method:	Disposed by:	Date/Time:	
Comments:		·	

Westinghouse Hanford Co.

# OFF-SITE PROPERTY CONTROL

(To be obtained from PROPERTY MANAGEMENT)

Honford C	<b>0.</b>	PRO	PERTY CO	NTROL		HAN- HO	297 WOL-0071
		PART	I - TO BE COMPLE	TED BY OF	RIGINATOR	per yang	#// NATI 195-11
Department Environme	ntal Emine	erina Section	Technica	1 Basel	line	Unit	
		to be shipped from	Cont		☐ Vendoi	,	
Routir	19 Emery		Cont	ractor	☐ Vendo	7	
Shipped to K-25 U.S. Departme Yo Martin Ma Dik Ridge Ga Sair Road, Hi	nt of Enen	gy gy systems, sion Plant 1-740	Off-sit ATTA Full Tit		Kirkpatriç	K, K-1004A c	droppoint A 20
Quantity	114 11651	Description (Inch	ude Serial and an	y Governm	ent Tag Numbe	rs)	Original Cost
	- <i>Sample</i> : -Sample	rest s of soil, pa # BOOJ 75, # BOOHZ t EAOID) (	B00176 3 (Sepa	rate /			
☐ Classified	d Unclas	attina (Torsi	oped Under DOE			d Under Contractor's U	
BIII of Ladi	ling # <u>34</u>	le an-site. 7485669 ION MONITORING RE		SECURED T	HF SAMF DAY I	HAT MATERIAL IS DELIV	VERED TO SHIPPING
RM Clearance for Pu		ION MONTO CHING RE	LEMSE MOST BE	RM Survey		HAT MATERIAL IS DELT	Date
Location of Property 200 DP-1 Date Ready for Ship	1300-F	-F-/	Cost Code to be (	Mitche.	//	Approximate Date Th	Phone 376-5133
Originated By Mi	tche//		E32NA Date	Authoriz	81220 red By 1201	Property will be Retur	Date   9   9
Signature and Nami	<del></del>	rol	Custodian Date	Propers	Management	Approvál	21/1/91
		PAF	RTII - TO BE CON	APLETED B	Y SHIPPING	<del>_/</del>	——————————————————————————————————————
Signature of Recipie	Densia 4-4-	it 91	Return Order No	···	Date issued	Purchase Order No	Date issued
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White, Green, Goldenrod – Ri		perty Management	White - Pri Yellow - Ri	operty Man	agement Gree	- Sign all Copies and For en - Property Control Cu - Originator	rward to: ustodian (Issuing Office)

EMER!	J
WORLDWIDE	,



# SIGNATURE AND TALLY RECORD

SHIPPERNAME AND ADDRESS
L'ESTINGHOUSE SHIPPING DEPT (509) 376-6655
G2-06 U. S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD COMPANY
2355 STEVENS DRIVE
PO BOX 1970
RICHLAND NA 99352

CONSIGNEE NAME AND ADDRESS

CR KIRPATRICK K1004A DROP POINT A20
US DEPARTMENT OF EHERGY
MARTIN MARIETTA ENERGY SYSTEM
BLAIR ROAD HWY 58
OAK RIDGE TH 37831

Pieces	Weight	Boor 94, Boor 9	#91=0=0145 443 -		Emery Authorization No.	
1_			SILON 6 WATER SAMP	LES		
	EACH PERSON HANDLI	NG OR TAKING CUSTO	DDY OF THIS SHIPMENT MU	ST SIG	N AND COMPLETE THE INFORMAT	TION BELOW
	Name of Person/Cor	npany	Transship Point/Destination	Sig	nature of Person Accepting Custody	Time/Date
1JOYCE	DEMAREST 1167/11	HOUSE SHIPPING	RICHLAND NA	<u> </u>	19-day	/04-04-91
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C-1/ (	(2)115 de	_	CONSTRUCTION.	<i>J.</i>	Joseph	4-6-91 1305

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PRIXIX COL OTH COMMT   Second Day   Second Day   Second Day   Second Day   Second Day   Second Day   Debey   D	CASH T GEL T	Stort I	1011	$I_{L}$	1.	Same Day XX	O'NITE Exp	ress Business Documents
E SIDER'S ACCOUNT Number  WESTINGHOUSE SHIPPING DEPT (509) 376-9665  From:  WESTINGHOUSE SHIPPING DEPT (509) 376-9665  U. S. DEPARTMENT OF ENERGY C/O  WESTINGHOUSE HANFORD  BLDG 1163 2355 STEVENS DRIVE  BLAIR ROAD HNY 58  RICHLAND  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY SYSTEM  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WARTIN MARIETTA ENERGY  WAR			É EN	ner!	H A	☐ c □ 5	Saluritas com	Clearance 🖳
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RICHLAND    Canada   OAK RIDGE   TN			<del>-</del>				for 🖂	
RICHLAND  WA OAK RIDGE IN Orthogonal for the value of the goods in the amount shown above.  Customer's Reference Numbers  W81231 ED3E1 W91-0-0145 #43 99352  Description Formation or RATES  Description Formation or RATES  Description Formation or RATES  CALL 1-800 H EMERY  (1-800-443-6379)  Declared Value  Streets  Free Outside TN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE  OAK RIDGE IN  OAK RIDGE IN  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK RIDGE  OAK	2355 STEVENS DRI	VE	Connedo E	BLAIR	ROAD HWY 5	58		
Customer's Reference Numbers  W81231 ED3E1 W91-0-0145 #43 979352  E Consignee's Account Number  37831  Shown above.  1 Cooler ID EPSILON 6  WATER SAMPLES B00F94  B00EF95  W1 2 3 4 5 6  7 8 9 0 1 2  SIGNATURE SECURITY SERVICE  Showing Signates  Alternational Services  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Signature  Showing Sig	RICHLAND	NA		UVA D	INCE	TN		only to the shipper
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#### MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003 OAK RIDGE, TENNESSEE 378317440

February 24, 1992

Ms. Joan Kessner Westinghouse Hanford Company Office of Sample Management 2355 Stevens Drive Richland, Washington, 99352

Dear Ms. Kessner:

#### Radiochemistry Analytical Results Package on Project 91-020: 200-BP-1 Samples

Attached are the analytical results of the radiochemical analysis on the 200-BP-1 samples, SDG# BOOJ75, Project 91-020, received into the K-25 Site Analytical Chemistry Department (ACD) laboratories on April 6, 1991. Also attached are copies of the AnaLis report forms, the Chain of Custody records and sample receipt documentation for the samples, a sample identification table and a summary of the protocol utilized to perform these analyses in accordance with agreements between the OSM and K-25 ACD. The results are reported on DOE Environmental Survey forms for the radiochemistry analyses. All data quality objectives were satisfied on this project.

I certify that this data package is in compliance with the terms and conditions of the OSM's revised Statement of Work and letter dated December 20, 1990, both technically and for completeness, for other than the conditions detailed in the following forms. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signatures.

Sincerely,

Deborah L. Amburgey

Program Manager

Hanford Support Program

Clarence K. Kirkpatrick by SEC Clarence R. Kirkpatrick

Program Manager

Waste Management Analysis

Roy W. Morrow Department Manager

K-25 Site Analytical Chemistry Department

Attachments

cc/attach: D.L.Amburgey

S.R.Smith - RC

cc: N.P.Buddin

### PROTOCOL UTILIZED FOR RADIOCHEMICAL ANALYSES OF

#### 200-BP-1 SAMPLES

	<u>Analysis</u>	<u>Protocol</u>
A.	Alpha Activity	EPA-900.0
B.	Beta Activity	EPA-900.0
C.	Cesium-137	EC-134
D.	Plutonium (-238, -239)	TP-1635
E.	Strontium	EPA-906.0
F.	Technetium-99	EC-186 (TP-1628)
G.	Uranium Alpha Activity	TH A-485

# SAMPLE IDENTIFICATION TABLE FOR SDG# BOOJ75

### 200-BP-1 SAMPLES

Date Received	OSM Sample ID	Lab Sample ID	Matrix	Comments
4/06/91	BOOJ75	910412-211	soil	
	ВООЈ76	910412-212	soil	
	BOOJ75-MS	910415-089	soil	Matrix spike of BOOJ75 (910412-211)
	BOOJ75-MSD	910415-090	soil	Matrix spike duplicate of BOOJ75 (910412-211)

Date Printed: 25-FEB-1992 09:27

AnaLIS ID: 910412-211

Project: G132 0201

Customer Sample ID: BOOJ75

Customer: KESSNER

Requisition Number:

Date Sampled: 1-APR-1991

Sampled By:

Date Sample Received: 6-APR-1991

Material Description: SOIL

Date Sample Completed: 24-SEP-1991

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result QQ	Limit ual of Error	Units	Analyst	QA File Number	Date Completed
***** Spectro	ochemistry Laboratory *****						
	Selenium	****		ug/Kg	29175	10427A	27-JUN-1991
***** Inducti	vely Coupled Plasma Laborato	ry ****					
EPA-3050 EPA-200.7	Bismuth	<10.0		mg/Kg	EA HESTER	10716В	16-JUL-1991
**** Radioch	emistry Laboratory ****						
EC-134	Cesium-137	2.93	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.26	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	5.97	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.31	+/- 4.6E-1	pCf/g	SM KINNEBREW	ENV-534	29-MAY-1991
1HA-485	Uranium Alpha Activity	3.66E-1	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	-1.54	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	2.58E-2	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	-2 ₋ 58E-2	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	mistry Laboratory ****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1		ug/g	900019	91-29	20-MAY-1991

#### Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
NITRATE	0	100	99	ug/g	99.	99.0
ORTHO PHOSPHATE IC	0	100	88	ug/g	88.	88.0
SULFATE	0	200	176	ug/g	176.	88.0

Date Printed: 25-FEB-1992 09:28

Analis ID: 910412-212

Project: G132 0201

Customer Sample ID: BOOJ76

Customer: KESSNER Date Sampled:

1-APR-1991

Requisition Number:

Sampled By:

Date Sample Received:

6-APR-1991 Date Sample Completed: 24-SEP-1991

Material Description: SOIL

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[]: Result has been Corrected for Spike

Procedure No.	Analysis	Result C	Limit Qual of Erro	r Units	Analyst	QA File Number	Date Completed
***** Spectro	ochemistry Laboratory *****						
·	Selenium	******		ug/Kg	29175	10427A	27-JUN-1991
**** Inducti	ively Coupled Plasma Laborator	~y ****					
EPA-3050 EPA-200.7	Bismuth	<10.0		mg/Kg	EA HESTER	10716B	16-JUL-1991
**** Radioch	nemistry Laboratory ****						
EC-134	Cesium-137	20.22	+/- 8.2	E-1 pCi/g	SM KINNEBREW	ENV-534	6-มีนห-1991
EPA-900.0	Alpha Activity	3.27	+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80	+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65	+/- 5.4	•	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1	+/- 2.2	i-1 pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10	+/- 15.	-	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.00	+/- 1.0	-1 pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	-2.58E-2	+/- 8.9	-2 pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	mistry Laboratory ****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1		ug/g	900019	91-29	20-MAY-1991

Date Printed: 10-FEB-1992 14:23

AnaLIS ID: 910415-089

Project: G132 0201

Customer Sample ID: BOOJ75-MS Requisition Number:

Date Sample Received: 6-APR-1991

Sampled By:

Date Sampled: 1-APR-1991

Date Sample Completed:

Material Description: SOIL

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

Customer: KESSNER

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result Q Qual	Limit of Error	Units	Analyst '	QA File Number	Date Completed
***** Spectr	ochemistry Laboratory *****						
	Selenium			ug/Kg			
***** Induct	ively Coupled Plasma Laboratory	, ****					
EPA-200.7(CLP	) Bismuth	NA		ug/Kg	MJ SCHEUER	NA	16-JUL-1991
**** Radioc	hemistry Laboratory *****						
EC-134	Cesium-137	NA	+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.40E3	+/- 27.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	1.79E3	+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.13E4	+/- 35.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	35.50	+/- 1.9	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	3.37E2	+/- 21.7	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	1.35E-1	+/- 1.4E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	11.00	+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Ch	nemistry Laboratory *****						
EPA-300.0	Nitrate	88		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	99		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	176		ug/g	CA SEDLACEK	91-44 IA	21-APR-199"
EPA-335.2	Cyanide			ug/g	MH FELLER	x	21-APR-199"

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PREFORMED ON CYANIDE ANALYSIS

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

## Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Date Printed: 10-FEB-1992 14:24

AnaLIS ID: 910415-090

Date Sampled: 1-APR-1991

Project: G132 0201

Customer Sample ID: BOOJ75-MSD

Customer: KESSNER

Requisition Number:

Date Sample Received: 6-APR-1991

Sampled By:

Date Sample Completed: Date Sample Approved:

Material Description: SOIL

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result Q	Limit Qual of Error	Units	Analyst	QA File Number	Date Completed
***** Spectro	ochemistry Laboratory *****						
	Selenium			ug/Kg			
***** Inducti	ively Coupled Plasma Laboratory	***					
EPA-200.7(CLP)	) Bismuth	NA		ug/Kg	MJ SCHEUER	NA	16-JUL-1991
**** Radioch	nemistry Laboratory ****						
EC-134	Cesium-137	NA	+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
EPA-900.0	Alpha Activity	1.52E3	+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-199
EPA-900.0	Beta Activity	1.84E3	+/- 29.0	pCi/g	SM KINNEBŘÉW	ENV-534	10-มีมห-199
EPA-906.0	Strontium	1.82E4	+/- 33.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-199
IHA-485	Uranium Alpha Activity	37.90	+/- 2.1	pCi/g	SM KINNEBREW	ENV-534	28-APR-199
TP-1628	Technetium	3.27E2	+/- 21.5	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-238	1.73E-1	+/- 1.5E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
TP-1635	Plutonium-239	11.20	+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-199
**** Wet Che	emistry Laboratory *****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-199
EPA-335.2	Cyanide	X		ug/g	MH FELLER	x	21-APR-199

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PERFORMED ON CYANIDE ANALYSIS

***** Comments from the Radiochemistry Laboratory *****

THE SPIKE RECOVERY ON SAMPLE NUMBERS 910145-089MS, 090MSD FOR PLUTONIUM WAS BASED ON THE TOTAL OF PU-238 AND PU-239. 910415-090

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

...



0034-PKB.93 February 12, 1993

Mr. Mark A Buckmaster Westinghouse Hanford Company P. O. Box 1970 MSIN H4-55 Richland, Washington 99352

Subject:

Deliverable for 200-BP-1 Data Validation, Task Order S-92-19, WHC Contract

No. MLW-SVV-073750

Dear Mr. Buckmaster:

Enclosed is a deliverable required by the referenced SAIC Task Order and WHC contract. Included in this deliverable, please find a copy of Data Validation Summary Report for Data Packages BOOFH5, and BOOJ75. This deliverable was prepared by Golder Associates under the direction of Kent Angelos.

Should you have any questions, please do not hesitate to contact the following: Kent Angelos of Golder Associates at (206)883-0777, Michael Hoxie or myself at (509) 783-1446.

Sincerely yours,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

P. K. Brockman

Program Manager

PKB/aps

Enclosure

cc w/encl:

B. Colley, WHC

B. Bechtold, WHC

LB/Task 92-19 Deliv File

cc w/o encl:

R. Henckel, WHC

D. Wilson, WHC

D. Caldwell, GAI



## Science Applications International Corporation An Employee-Owned Company

1075-PKB.92 September 28, 1992

Mr. Mark A. Buckmaster Westinghouse Hanford Company P.O. Box 1970, MSIN H4-55 Richland, WA 99352

Subject:

Deliverable for 200-BP-1 Data Validation, Task Order S-92-19 Rev. D, WHC

Contract No. MLW-SVV-073750

Dear Mr. Buckmaster:

Enclosed is the subject deliverable required by the referenced SAIC Task Order and WHC contract. Included in this deliverable, please find a copy of the Data Validation Summary Report for Data Package B00J75. This deliverable was prepared by Golder Associates with support from Ken Ridgway of SAIC under the direction of Kent M. Angelos.

Should you have any questions, please do not hesitate to contact the following: Mr. Kent Angelos of Golder Associates at (206) 883-0777, Michael Hoxie or myself at (509) 943-3133.

Sincerely yours,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

P. K. Brockman Program Manager

PKB/mkc

**Enclosures** 

cc w/encl:

B. Bechtold, WHC

LB/Task S-92-19 Deliv File

cc w/o encl:

R. Henckei, WHC

D. Martin, Albq

D. Wilson, Whc

cc: w/encl (including original data package):

D. Leech, WHC

## Science Applications International Corporation An Employee-Owned Company

1043-PKB.92 September 18, 1992

Mr. Mark A. Buckmaster Westinghouse Hanford Company P.O. Box 1970, MSIN H4-55 Richland, WA 99352

Subject:

Deliverable for 200-BP-1 Data Validation, Task Order S-92-19, WHC Contract

No. MLW-SVV-073750

## Dear Mr. Buckmaster:

Enclosed is the subject deliverable required by the referenced SAIC Task Order and WHC contract. Included in this deliverable, please find a copy of the Data Validation Report for Data Package B00FH5. This deliverable was prepared by Golder Associates with support from Ken Ridgway of SAIC under the direction of Mr. Kent Angelos.

Should you have any questions, please do not hesitate to contact the following: Mr. Kent Angelos of Golder Associates at (206) 883-0777, Mr. Mike Hoxie or myself at (509) 943-3133.

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D. Martin, Albq

D. Wilson, Who

cc: w/encl (including original data package):

D. Leech, WHC





## Report To

Westinghouse Hanford Company Richland, Washington

Data Validation Report
200-BP-1 RI/FS
Laboratory: Martin Marietta
Data Package: B00J75
Sample Matrix: Soil
Analysis Type: Inorganics/Wet Chemistry

Prepared By

Golder Associates Inc. Redmond, Washington

September 25, 1992 i	913-1719
TABLE OF CONTENTS	Page No.
1. INTRODUCTION	1
2. DATA QUALITY OBJECTIVES	`; <b>1</b>
3. QUALIFIED DATA	1
<ul><li>3.1 Major Deficiencies</li><li>3.2 Minor Deficiencies</li><li>3.2.1 Metals</li><li>3.2.2 Wet Chemistry</li></ul>	1 1 2 2
4. CONCLUSION	2
5. REFERENCES	2

## LIST OF APPENDICES

APPENDIX A As-Qualified Data Summary APPENDIX B Data Review Supporting Documentation, SDG B00J75

#### 1. INTRODUCTION

This report presents the results of data validation on the following sample delivery group and sample numbers which were analyzed by the Martin Marietta K-25 - Oak Ridge, TN laboratory. The HEIS sample numbers associated with this group by SDG are:

<u>Data Package ID</u>	HEIS Sample Numbers	<u>Matrix</u>	
SDG: B00]75	B00J75A, B00J76A	Soil	

Sample identifications, locations and sample dates are provided in the tabular data summary provided in Attachment 3. Data validation was conducted in accordance with the Westinghouse Hanford Company statement of work (WHC 1991) and validation procedures (WHC 1992).

## 2. DATA QUALITY OBJECTIVES

## Completeness

The data package was complete for all requested analyses and met the data quality objectives of the work plan. Data quality objectives for the project specified the use of CLP methods for the TAL metals/cyanide analytes and the use of standard methods for all other parameters.

## Sample Quantitation Limits

Sample quantitation limits were met with the exception of nitrate, ortho-phosphate, and sulfate. The contract required quantitation limit (CRQL) for these parameters is 4 mg/Kg and they were reported to a quantitation limit of 20 mg/Kg.

## 3. QUALIFIED DATA

This section presents a summary of the qualifications required based on validation of the subject data package.

#### 3.1 Major Deficiencies

The following presents a summary of the rejected data.

### <u>Inorganics</u>

Cyanide results were rejected due to a deficiency of standards used in the initial equipment calibration. At least three standards are required for initial calibration but only one was used.

Bismuth results were rejected due to the sample spike recovery being less than 30% and the sample result being less than the instrument detection limit (IDL).

## Wet Chemistry

No deficiencies were identified requiring rejection of data.

### 3.2 Minor Deficiencies

The following qualifications were required as a result of the validation. Attachment 2 provides a summary of the samples affected.

#### 3.2.1 Metals

## Correlation Coefficient

• The correlation coefficient for the initial calibration of the furnace atomic absorption analysis for selenium was less than .995. Selenium results have been qualified as estimated (UJ for non-detects).

## **Holding Times**

• The holding time for cyanide was exceeded. No qualification was necessary as cyanide results have been rejected due to calibration deficiencies.

## 3.2.2 Wet Chemistry

## **Holding Times**

 The holding time was exceeded for nitrate, ortho-phosphate, and sulfate. Associated sample results have been qualified as estimated (UJ for non-detects).

## 4. CONCLUSION

Sections 1 through 3 present a summary of the data quality for the subject data package. The results contained in this report are acceptable for use with the exception of the major deficiencies reported in Section 3.1.

The appendices provide supporting documentation and a tabular summary of the qualified data. The original, as-recieved data package is enclosed for submittal to the project QA record.

## 5. REFERENCES

- WHC, 1991, Westinghouse Hanford Company, Validation of 200-BP-1 Data, Statement of Work, Revision A, November 1991. Westinghouse Hanford Company, Richland, Washington.
- WHC, 1992, Data Validation Procedures for Chemical Analyses, Westinghouse Hanford Company, Richland, Washington.

# APPENDIX A AS QUALIFIED DATA SUMMARY

Laboratory Martin Marietta	SDG	B00J75			
Sample Number		B00J75/	A	B00J76	A
Remarks		totai		total	
Sample Date		4-1-91		4-1-91	
Inorganic Analytes	CRQL	Result	Q	Result	Q
Aluminum	40	NR		NR	
Antimony	12	NR		NR	
Arsenic	2	NR		NR	
Barium	40	NR		NR	
Beryllium	1	NR		NR	
Cadmium	1	NR		NR	
Calcium	1000	NR		NR	
Chromium	2	NR		NR	
Cobalt	10	NR		NR	
Copper	5	NR		NR	
Iron	20	NR		NR	
Lead	1	NR		NR	
Magnesium	1000	NR		NR	
Manganese	3	NR		NR	
Mercury	0.04	NR		NR	
Nickel	8	NR		NR	
Potassium	1000	NR		NR	
Selenium	1	0.41	IJ	0.42	IJ
Silver	2	NR		NR	
Sodium	1000	NR		NR	
Thallium	2	NR		NR	
Vanadium	10	ΝR		NR	
Zinc	4	NR		NR	
Cyanide	5	0.1	R	0.1	R
Bismuth	10	10.2	R	10	R
Nitrate by IC	4	20	UJ	20	UJ
Phosphate by IC	4	20	IJ	20	UJ
Sulfate by IC	4	20	U	20	U

## APPENDIX B

## DATA REVIEW SUPPORTING DOCUMENTATION

SDG: B00J75

Samples: B00J75, B00J76

## CONTAINS:

ATTACHMENT 1 - GLOSSARY OF DATA REPORTING QUALIFIERS

ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS

ATTACHMENT 3 - AS QUALIFIED LABORATORY DATA
ATTACHMENT 4 - DATA VALIDATION SUPPORTING DOCUMENTATION

#### ATTACHMENT 1

## GLOSSARY OF DATA REPORTING QUALIFIERS

- B- Indicates tha compound or analyte was analyzed for and detected. The value reported is less than the CRQL but greater than the IDL.
- U- Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.
- UJ- Indicates the compound or analyte was analyzed for and not detected. Due to an identified quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.
- J- Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are usable for decision making processes.
- R- Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.
- NJ- Indicates presumptive evidence of a compound at an estimated value.
- N- Indicates presumptive evidence of a compound.

# ATTACHMENT 2 SUMMARY OF DATA QUALIFICATIONS

## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: AND J75	REVIEWER: Salukh	DATE: 9-12-92	PAGE_/OF/_
COMMENTS:	10-2-96-22 C-C-2		
COMPOUND .	QUALIFIER	SAMPLES AFFECTED	REASON
_ CN	R	B00575A B00576A	
Bí	R	BOOT 751: BOOT 76A	Level for colibration
			recovery 4302
Se	UJ	B00.T75AB00.T76A	
<u></u>			4.995
			<u>.</u>
		·	

## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B00575	REVIEWERS. Schildt	-DATE: 9-17-92	PAGE/OF_/_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NO2, PO4, SO4	UJ	B00 J 759 B00 J 78	Holding time
345 73 82 a 23 82		B005755B00J78	exceeded
		·	

# ATTACHMENT 3 AS QUALIFIED LABORATORY DATA

## ENVIROFORMS/CLP 788

SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

. Contract:

West Surface 13 day

Lab Code: K25

Case No.:

SAS No.:

B 00J 75 SDG No.: BOOFHS

BOOJ75A

Matrix (soil/water): SOIL

Lab Sample ID: 910412-211

Level (low/med): LOW

Date Received: 04/06/91

% Solids:

97.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

			· · ·		T 1
CAS No.	Analyte	Concentration	С	Q	М
	-		-  -		NR
			_		NR NR
	Bismuth	10.2	<u>u</u>	Ń	NR NR NR NR NR
			_		NR NR NR
			=		NR
	-		_		靈
	-		_		NR NR
	-		=		NR NR
			_		NR NR
			-		NR NR NR NR NR NR NR NR NR NR NR NR NR N
	_		-		NR NR NR
	-	· [ <del> </del>	-		NR

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN Clarity After: CLEAR Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910412-211

## 1 INORGANIC ANALYSES DATA SHEET

EDA	SAMPLE	NO
	SEMETH	INC.

Lab Name: MARTIN_MAR	IETTA_K25_SITE_	Contract: HANFORD	BOOJ75A Near Surface 13 Nuy
Lab Code: K25ACD	Case No.:	SAS No.:	SDG No.: BOOJ75
Matrix (soil/water):	SOIL_	Lab Sample	e ID: 910412-211
Level (low/med):	LOW	Date Rece	ived: 04/06/91
% Solids:	97.5		

Concentration Units (ug/L or mg/kg dry weight): MG/KG

ı <del></del>	I	· · · · · · · · · · · · · · · · · · ·				ı
CAS No.	Analyte	Concentration	С	Q	M	
7429-90-5	Aluminum		-		NR	}
7440-36-0	Antimony_		-	[	NŔ	ĺ
7440-38-2	Arsenic	· · · · · · · · · · · · · · · · · · ·	-	<del></del>	NR	
7440-39-3	Barium		<b>-</b>		NR	
7440-41-7	Beryllium				NR	ļ
7440-43-9	Cadmium			<del></del>	NR	
7440-70-2	Calcium		-		NR	
7440-47-3	Chromium		_		NR	
1	Cobalt		-		NR	
7440-50-8	Copper		-		NR	
7439-89-6	Iron		-		NR	
7439-92-1	Lead		1-		NR	
7439-95-4	Magnesium		-		NR.	
7439-96-5	Manganese		_		NR	ĺ
7439-97-6	Mercury		-		NR	
7440-02-0	Nickel		-		NR	
7440-09-7	Potassium		-		NR	W J
7782-49-2	Selenium	0.41	V	WN	F	M 4
7440-22-4	Silver				NR	1
7440-23-5	Sodium		_		NR	
7440-28-0	Thallium_		_		NR	
7440-62-2	Vanadium_				NR	
7440-66-6	Zinc				NR	
	Cyanide			l	NR	l
					<u> </u>	

Color Before:	BROWN	Clarity Before		Texture:	COARSE
Color After:	BROWN	Clarity After:	<del>** * ********************************</del>	Artifacts:	YES
Comments: ROCKS					<del>-</del>

FORM I - IN

190 High.

## U.S. EPA - CLP

			INORGANIC A	l Nalysis data s	HEE	T	EP	A SAME	PLE NO.
Lab Name:	Mar	tin Mari	ettc ·	Contract:			N.C	00 J 7	15A
Lab Code:	: <u>Ka</u> :	<u>5</u>	Case No.:	SAS No.:	:		SD	G No.:	B00 ज 7
Matrix (:	soil/w	ater): <u>S</u>	<u> </u>		Lai	Sampl	e I	D: 9/09	112-211
Level (lo	ow/med	): 			Dat	te Rece	eive	a: <u>4/6</u>	191
% Solids:	:	9	7.5						
			<del></del>	L or mg/kg dry	· we	ight):	m	lka	
					-			<u></u> *	••
		CAS No.	Analyte	  Concentration	c	Q	M		
		7429-90-	5 Aluminum		- -				
		7440-36-	-0  Antimony_		iIi.				
		17440-38-	• • • • • • • • • • • • • • • • • • • •	l	1_1				
			-3  Barium	<u> </u>	<u> _</u>  .		!!		
			-7  Beryllium -9  Cadmium	<u> </u>	<u> </u>  -		!		•
		•	-2 Calcium	ļ	<u> -</u>  -	<del></del>	<b>!</b> !		•
			-3 Chromium	<u></u>	- ·		¦¦		
		7440-48-			ii-		i—i		
			-8  Copper		i_i.		i_i		
		17439-89	· —	ļ	!_!.		!!		
		7439-92-  7439-95-		ļ	<u> -</u>  -	<del> </del>	!!		
		•	-5   Manganese		╏╼╏╸		{}		
			-6 Mercury	i———	╏╼╏╸		<b>i—</b> i		
			-0 Nickel	i	i-i		ii		
		•	-7 Potassium		i_i		$i \equiv i$		
		17782-49		1	İΞİ		$i \equiv i$		
		7440-22	1		1_1.				
		17440-23			<u>ļ.,</u> ļ.		!!		
		17440-28	-0  Thallium_ -2  Vanadium		·!!.		!!		
		7440-66		·	·!!·		!!		
		1740	Cyanide	< 0.1	-  -	R	¦¦		
			0,		·¦-¦·				
Color Be	fore:		Clari	ty Before:			Tex	ture:	
Color Af	ter:		Clari	ty After:		•	Art	ifact	s:
Comments	::								
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				· · · · · · · · · · · · · · · · · · ·	·				

3/90

## ENVIROFORMS/CLP 788

INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

BOOJ76A Wear Surface 17

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOF#5

Matrix (soil/water): SOIL

Lab Sample ID: 910412-212

Level (low/med): LOW

Date Received: 04/06/91

% Solids:

94.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	С	Q	м	
			-		NR ND	
			1		NR NR	
	Bismuth	10.0	ij	N	P	R
			-		NR NR	!
			<u>-</u>		NR NR	<u> </u>
			_		NR NR	
			_		NR NR	
			  -		NR NR	
			— :   —		常服	
			_		<b>  当日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日</b>	

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: LT. GREEN

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910412-212

## U.S. EPA - CDP

## 1 INORGANIC ANALYSES DATA SHEET

			•
EPA	SAMPLE	N	O.

Lab Name: MART	IN_MARIETTA	_K25_SITE_	Contract: H	NF(	ORD	BOOJ76 Near Surface	
Lab Code: K25A0	CD Cas	se No.:	SAS No.:	: _		SDG No.: B	00J75
Matrix (soil/wa	ater): SOIL	_		Lai	o Sampl	e ID: 91041.	2-212
Level (low/med)	: LOW_	_		Dat	te Rece	eived: 04/06	/91
% Solids:	_94.9	€					
Cor	ncentration	Units (ug/	'L or mg/kg dry	y We	eight):	MG/KG	
	CAS No.	Analyte	Concentration	С	Q	м	
Color Before: Color After:	7440-36-0 7440-38-2 7440-39-3 7440-41-7 7440-43-9 7440-47-3 7440-48-4 7440-50-8 7439-89-6 7439-92-1 7439-96-5 7439-97-6 7440-02-0 7440-09-7 7782-49-2 7440-23-5				WN	NR NR NR NR NR NR NR NR NR NR NR NR NR N	COARSE YES
Comments: ROCKS							<del></del>

FORM I - IN

190 Hall

		U.S.	EPA - CLP		14
	ı	NORGANIC A	1 Nalysis data	SHEET	EPA SAMPLE NO.
Lab Name: M	artin Marie	Ha	Contract:		BOOJ 76A NEAR SUFFACE 17 days
Lab Code: K	2 <u>5</u> ca	se No.:	SAS N	o.:	SDG No.: 800375
Matrix (soil,	(water): Soi	<u> </u>		Lab Sam	ple ID: 910412.212
Level (low/me	1 5.4			Date Re	ceived: 4/4/91
% Solids:	94.	9_			
c	oncentration	Units (ug,	/L or mg/kg d	iry weight;	): mg/Ks
		1	1	1 1	1 1
	CAS No.	Analyte	Concentrati	onici Q	M
	7429-90-5	Aluminum		_	<b>-</b>
	7440-36-0	Antimony_	. !		<u> </u>
	7440-38-2	Arsenic_		_	_!!
	17440-39-3	•			
	[7440-41-7 [7440-43-9			-	
	7440-70-2		·	{-}	
	7440-47-3	· · · · · · · · · · · · · · · · · · ·			<b></b>
	7440-48-4		ļ		
	7440-50-8			!!	_!!
	17439-89-6 17439-92-1	· · · · · · · · · · · · · · · · · · ·	-		
	7439-95-4				— <del>   </del>
	7439-96-5			<u> </u>	—
	7439-97-6	· · · · · · · · · · · · · · · · · · ·			<b>_</b> ii
	7440-02-0	, <del></del>		!_!	
	7440-09-7  7782-49-2	•		!-!	!
	7440-22-4				
	7440-23-5				
		Thallium			-
	7440-62-2			i_i	
	7440-66-6		_		
	<u> </u>	Cyanide_	(0.1	_ &_	
	l	_	- !		
Color Before		Clar	ity Before:	<del></del>	Texture:
Color After:	•	Clar	ity After:		Artifacts:
Comments:					

## 1-1 INORGANIC ANALYSES DATA SHEET WET CHEMISTRY

Lab Name:	Oak Ridge I Analytical		Department	Contr		Westingh Hanford		
Matrix (s	oil/water):	Soil	s	DG#: _	_BOOJ	75	·	
ACD Samplo ID Number	e :910412-1	211	Custom Sample D	er ID: _ ate Re	_BOOJ <i>Ner</i> ceive	175 <u>A</u> r surface ed: 6 Apr	e 13 dup il 1991_	, ,

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	N/A			
_Ammonia_	N/A			
Bromide	N/A	\ <del></del>		
Chemical O2 Demand	N/A			
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate_	<20UJ	ug/g	91-44IA	21-Apr-91
Nitrate Nitrogen	N/A		-   -	
_Nitrite	N/A			
Nitrite Nitrogen	N/A			
Ortho Phosphate	<20UJ	_ug/g	91-44IA	
Sulfate	<20 UJ 547355	_ug/g	_91-44IA_	21-Apr-91
Total Organic Carbon	N/A			
Total Organic Halides_	N/A			
Turbidity	N/A			er er
pH	N/A		.	
		<u> </u>		
			.	
		l	.	l
		l	.	.

Comments:					-	
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Alista

## 1-2 INORGANIC ANALYSES DATA SHEET WET CHEMISTRY

	pany
Matrix (soil/water):Soil SDG#:BOOJ75	·
ACD Sample ID Number:910412-212	17 dup pril-1991
Analyte Concentration Units Batch No. Date	of Analysis
Alkalinity Ammonia Bromide Chemical O2 Demand Chloride IC Conductivity Dissolved Solids Fluoride SIE N/A Nitrate Nitrate Nitrate Nitrite Nitrite Nitrite Nitrite Sulfate Total Organic Carbon Total Organic Halides Turbidity PH N/A N/A  N/A N/A  N/A N/A  N/A N/A  N/A N/A	-Apr-91
Comments:	, - 

All 92

# ATTACHMENT 4 DATA VALIDATION SUPPORTING DOCUMENTATION

## WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200-B P-1	REVIEWERS Soli H	DATE	: 9-1	7-92
LABORATORY: Martin Marietta K.25	CASE:	SDG:	Boo:	T75
SAMPLES/MATRIX: BOD J 75A, BOD	1 : 1			
			<del></del>	
				<u></u>
		<del></del>		
			<del></del>	
1. DATA PACKAGE COMPLETENESS				
Review the data package for completeness and checelements are missing contact the laboratory for sub-		any da	ta review	,
Data Package Item	Present?:	Yes	No	N/A
Case Narrative				_
Cover Page				
Traffic Reports/Chain-of-Custody		~		
Sample Analysis Data Report Forms		<u> </u>		
Standards Data			<u> </u>	
QC Summary				
Blanks Summary Report Forms				_
Spike Sample Recovery Report Forms		4		
Duplicate Sample Analysis Report Forms				
Laboratory Control Sample Report Forms				
Raw Data				
Ion Chromatograph Chromatograms TOC and TOX Instrument Printouts				_
Laboratory Bench Sheets Additional Data				
				_
Laboratory Sample Preparation Logs		_		<del></del> .
Instrument Run Logs		<u> </u>		
Internal Laboratory Chain-of-Custory				
Percent Solids Analysis Records Reduction Formulae			_	<u> </u>
Chemist Notebook Pages				<del></del>
Chemist Molecook Lages			<del></del>	
2. HOLDING TIMES				
Were all samples analyzed within holding times?		Yes	No	N/A

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

#### 3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used?

Yes

No N/A

Are the correlation coefficients ≥0.995?

Yes

No N/A

No

No

Was a balance check conducted prior to the TDS analysis?

Yes

NIA

Was the titrant normality checked?

Yes

N/A

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

## 4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency?

Yes

No N/A

Are ICV and CCV percent recoveries within control?

(Yes

No N/A

Are there calculation errors?

Yes

No

N/A

ACTION: Qualify all affected data in accordance with the validation requirements.

## 5. LABORATORY BLANKS

Are target analytes present in the laboratory blanks?

Yes



N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U) and list the affected samples and analytes below.

## 6. FIELD BLANKS

Are target analytes present in the field blanks?

Yes



ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

### 7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits?

Yes

To N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are > CRQL, qualify the data as estimated (J). If the spike recovery is <30% and the sample results are less then the IDL qualify the data as unusable (R).

## 8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits?

Yes No

NA

Are there calculation errors?

Yes

No

N/A

ACTION: Qualify the affected results according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for which the LCS  $\Re$ R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS  $\Re$ R < 50%.

SOLID LCS - Qualify as estimated (J), all sample results > IDL for which the LCS %R is outside the established control limits. Qualify as estimated (UJ), all sample results < IDL for which the LCS %R are lower than the established control limits.

### 9. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits?

Yes No



ACTION: Note the results of the performance audit samples in the validation narrative.

## 10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits?

(Yes)

N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

### 11. FIELD DUPLICATE SAMPLES

Do RPD values exceed the acceptance limits?

Yes No



ACTION: Note the results of the field duplicate samples in the validation narrative.

## 12. FIELD SPLIT SAMPLES

Do RPD values exceed the acceptance limits?

Yes No



ACTION: Note the results of the field split samples in the validation narrative.

## 13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?

Yes

No

N/A

Are instrument detection limits below the CRDL?

Yes (

N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

## 14. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Yes

No N/A

Were project specific data quality objectives met for this analysis?

Yes

No N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

SDG: BOOJ 75 COMMENTS:	REVIEWER:	S. Schi	16/T	DATE: 9-/	7-92		PAGEOF/_	
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER	
BOOJ 75A	NOz	4-1-91		4-21-91		20	J	
	P04						IT	
	50 ₄						— jrvit	5
BOOT 76A	NO3						15	ļ
	POY						1	
	504						Linone	-,5 9-
	•							
						_		
		·						

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WHC-SD-EN-SPP-002, Rev. 1

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWERSSchildt DATE: 9-17-92
LABORATORY: Martin Marietta K-25	CASE: BOOT 75 SDG: BOOT 75
SAMPLES/MATRIX: BOO J 75k BOO:	T76A/soil

## 1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative		<u></u>		
Cover Page				
Traffic Reports				
Sample Data	1			
Inorganic Analysis Data Sheets				
Standards Data				
Initial and Continuing Calibration Verification				
CRDL Standard for AA and ICP				
QC Summary		_		
Blanks				
ICP Interference Check Summary		<u> </u>		
Spike Sample Recovery				
Post-Digestion Spike Sample Recovery				<u></u>
Duplicate		7		
Laboratory Control Sample		_		
Standard Addition Results				
ICP Serial Dilutions				
Instrument Detection Limits		<u> </u>		
ICP Interelement Correction Factors		1		
ICP Linear Ranges		KKKK		
Preparation Log				
Analysis Run Log		<u> سبر</u>		
Raw Data				
ICP Raw Data				
Furnace AA Raw Data				<del></del> ,
Mercury Raw Data		<del></del>		
Cyanide Raw Data				
Additional Data		-1		
Internal laboratory chain-of-custody		<del></del> ,		
Laboratory Sample Preparation Records				

	,			
Data Package Item	Present?:	Yes	No	N/A
Percent Solids Analysis Records Reduction Formulae Instrument Run Logs Chemist Notebook Pages		<u>/</u>	<u> </u>	
2. HOLDING TIMES				
Have all samples been analyzed within holding times?		Yes	No	N/A
ACTION: If any holding times have been exceeded qual detects and UJ for nondetects).	lify all affected rest	ults as est	imated (	J for
3. INITIAL CALIBRATIONS				
Were all instruments calibrated daily, each set-up time as were the proper number of standards used?	nđ	Yes	No	N/A
Are the correlation coefficients ≥0.995?		Yes	No	N/A
Was a midrange cyanide standard distilled?		Yes	No	N/A
ACTION: Qualify all data as unusable if reported from calibrated or was calibrated with less than the minimum sample results > IDL as estimated (I) and results < IDL coefficient is < 0.995 or the laboratory did not distill the	number of standard as estimated (UJ),	is. Qualif	y associa relation	
4. INITIAL AND CONTINUING CALIBRATION VEI	RIFICATION			
Are ICV and CCV percent recoveries within control?		Yes	No	N/A
Are there calculation errors?		Yes	No	N/A
ACTION: Qualify all affected data in accordance with S calculation errors are noted, contact the laboratory for cl		alidation	requirem	ents. If
5. ICP INTERFERENCE CHECK SAMPLE				
Has an ICS sample been analyzed at the proper frequency	y?	Yes	No	N/A
Are the AB solution %R values within control?		Yes	No	N/A
Are there calculation errors?		Yes	No	N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

#### 6. LABORATORY BLANKS

Are target analytes present in the laboratory blanks?

(Yes)

o N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are > CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations < 10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

#### 7. FIELD BLANKS

Are target analytes present in the field blanks?

Yes No

N/A

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

#### 8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits?

Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is > 125% and sample results are < IDL no qualification is required. If spike recovery is > 125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

### 9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits?

No

N/A

Are there calculation errors?

Yes

N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for which the LCS %R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R < 50%.

SOLID LCS - Qualify as estimated (J), all sample results > IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results < IDL for which the LCS %R are lower than the established control limits.

#### 10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits?

Yes No

ACTION: Note the results of the performance audit sample analyses in the data validation narrative.

#### 11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable?

N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

### 12. ICP SERIAL DILUTION

Are the serial dilution results acceptable?

N/A

Is there evidence of negative interference?

N/A

ACTION: Qualify the associated data as estimated (I) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

#### 13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits?

Yes

No

N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

#### 14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits?

Yes

No

N/A

ACTION: Note the results of the field split samples in the validation narrative.

## 1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections?

No N/A

Are applicable duplicate injection RSD values within control?

Yes

No

N/A N/A

If no, were samples rerun once as required?

Yes

No

Does the RSD for the rerun fall within the control limits?

Yes

No

Were analytical spike recoveries within the control limits?

Yes

No

N/A

If no, were MSA analyses performed when required?	Yes	No NA
Are MSA correlation coefficients ≥0.995?	Yes	No N/A
If no, was a second MSA analysis performed?	Yes	No N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (I for detects and UI for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (I). If the analytical spike recovery is <10%, reject all nondetects as estimated (UI) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (I for detects and UI for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (I).

## 17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes No	N/A
Are all detection limits below the CRQL?	Yes No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

#### 18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes No	N/A
Were project specific data quality objectives met for this analysis?	Yes No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necess	sary);
1. No ayamale distill	ation log provided.
2. I blank and 1. st.	andard used for cyanid
de l'institution	want of the second
<u> </u>	
	•
<del></del>	
***	

## **HOLDING TIME SUMMARY - FORM B-1**

SDG:BOOT75	REVIEWER:	S. Sch	Oalt	DATE: 9-/	7-92		PAGE / OF /
COMMENTS:	Inorga	nies					
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOOJ751/70	B;	4-1-91	7-14-91	7-16-91	104	106	none
	5e	1	ł.	6-27-91	70	87	none
	CN		WA	5-20-91	NA	50	J
			-				
		<del> </del>			·		· · · · · · · · · · · · · · · · · · ·
	· · ·				] - <del></del>		
			<u> </u>				
		· · · · · · · · · · · · · · · · · · ·				 	

SDG: 1350 J 75	REVIEWER: S Schillt	DATE: 9-17-92.	PAGE_	<u>/</u> OF <u>_</u> /
COMMENTS: Leid	le Sample Recovery	(ICP)		
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
BODI765	Birmeth	9.9	BACIT F GA BROSTS	t K
	**************************************			
		}		

## BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG:800J75	SDG: BODJ75 REVIEWER: 5 Schilott COMMENTS: Inorganics				E: 4-/	7-92		PAGE_(_OF_/_	
COMMENTS:	Inorganics								
SAMPLE ID	сомроимо	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB2	Se	-2.1	B		15/Kg	10.5		None	
		·							
								<u> </u>	
					l				

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## Report To

Westinghouse Hanford Company Richland, Washington

Radiochemistry
Data Validation Summary Report
200-BP-1 Operable Unit RI/FS
Data Packages: B00FH5 and B00J75
Laboratory: Martin Marietta K-25 Laboratory

Prepared By

Golder Associates Inc. Redmond, Washington

February 9, 1993

Data Validation Documentation, SDG B00FH5

Data Validation Documentation, SDG B00J75

В

C

#### 1. INTRODUCTION

This report presents a summary of data validation conducted on radiochemistry analyses performed on two groundwater and two soil samples collected for the 200-BP-1 Operable Unit remedial investigation/feasibility study (RI/FS) at the Hanford Site. The samples were analyzed for radiochemistry parameters by the Martin-Marietta K-25 laboratory in Oak Ridge, Tennessee. The following analyses were validated:

- Gross Alpha/Beta
- Strontium-90
- Technetium-99
- Alpha spectroscopy (Isotopic Plutonium)
- Tritium
- Radium-226 by Lucas Cell Counting
- Uranium (Laser Fluorometry)
- Gamma Spectroscopy (Cesium-137, Cobalt-60)

Data validation and verification was conducted in accordance with the Westinghouse Hanford Company statement of work (WHC 1991) and validation procedures (WHC 1992). Data verification was conducted by comparison of the reported results against the raw data and laboratory worksheets provided in the data packages, discrepancies noted were corrected on the laboratory report forms and tabular summary provided in Appendix A.

Data validation was documented using a checklist prepared according to the requirements listed in the validation procedures (WHC 1992). Copies of the checklists are provided in Appendix B.

Data validation qualifiers assigned to the sample results as a result of the validation are explained below:

- U The constituent was analyzed for, but was not detected above the Lower Limit of Detection (LLD).
- UR The constituent was analyzed for, but was reported as not detected above the Lower Limit of Detection (LLD). The associated result is conditionally rejected pending submittal of missing documentation.
- UJ The constituent was analyzed for, but its absence (non-detection) is estimated and may be inaccurate or imprecise.
- J The associated value is an estimated quantity and may not represent the amount actually present in the sample.
- R The associated value is unusable.
- R* The constituent was analyzed for and detected. The associated result is conditionally rejected pending submittal of missing documentation.

## 2. DATA QUALITY OBJECTIVES

## 2.1 Detection Limit and Sample Result Verification

Sample results reported on the printed laboratory report forms were verified against the handwritten summary reports provided by the laboratory. No raw data were provided for any of the reported results, therefore minimum detectable activities and results could not be recalculated.

## 2.2 Accuracy

Accuracy as percent recovery of laboratory controls and matrix spike samples ranged from 70% to 148% for SDG B00FH5 and from 1% to 126% for SDG B00J75. The following analyses did not meet the work plan QA limits of 30 to 115% for accuracy:

- SDG B00FH5: gross beta, radium-226, strontium-90 and technetium-99.
- SDG B00J75: plutonium-238.

#### 2.3 Precision

Precision as relative percent difference (RPD) between duplicate and matrix spike/matrix spike duplicates ranged from 2% to 200% for SDG B00FH5 and from 2% to 25% for SDG B00J75. The following analyses did not meet the work plan QA limits of 35%:

SDG B00FH5: gross alpha and strontium-90.

#### 2.4 Field Blanks

No field blanks were submitted as part of this data set.

### 2.5 Completeness

Completeness of this data set could not be determined since the raw data was not provided to fully validate the data packages.

### 3. QUALIFIED DATA

## 3.1 Major Deficiencies

The following major deficiencies were identified in both data packages:

 SDG B00FH5: radium-226, strontium-90 and technetium-99 have been rejected since laboratory control sample or matrix spike sample recoveries were greater than 115%.

- SDG B00J75: plutonium-238 has been rejected since matrix spike sample recoveries were less than 30%.
- Missing raw data for all analyses resulting in conditional rejection of all remaining results (UR for non-detects, R* for detects).

## 3.2 Minor Deficiencies

The following minor deficiencies were identified in data package B00FH5:

RPD values for duplicate analyses were greater than 35% for sample results
greater than the detection limit for gross alpha, plutonium-239 and strontium90. No qualification was applied since all results with the exception of those
identified above have been conditionally rejected due to missing
documentation.

#### 4. CONCLUSION

Sections 1 through 3 present a summary of the data quality for the subject data set. The results contained in this report are acceptable for use as qualified with the exception of those sample results with major deficiencies as discussed in Section 3.1.

The appendices provide supporting documentation and a tabular summary of the qualified data. The original as-received data packages are being transmitted under separate cover for submittal to the project QA record.

### 5. REFERENCES

CDM, 1987, Data Quality Objectives for Remedial Response Activities, Development Process, March 1987, CDM Federal Programs Corporation, Annandale, Virginia.

WHC, 1991, Westinghouse Hanford Company, Validation of 200-BP-1 Data, Statement of Work, Revision A, November 1991. Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, Westinghouse Hanford Company, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 0, 1992. Westinghouse Hanford Company, Richland, Washington.

# APPENDIX A VALIDATED DATA SUMMARY AND QUALIFIED LABORATORY REPORTS

Table 1-1. Validated Radiochemistry Results SDGs: B00FH5 and B00J75

HEIS NO.:	B00FH5		B00F94		B00J75		B00J76	
LABORATORY:	K25	;	K25		K25		K25	5
UNITS:	pCi/l	L	pCi/l	<u>.</u>	pCi/{	g	pCi/g	
Cesium-137	2.44	R*	0.93	R*	2.93	R*	20.2	R*
Cobalt-60	12.0	R*	15.3	R*	NA		NA	
Gross Alpha	2.3	J	2.49	J	1.26	R*	3.27	R*
Gross Beta	588	R*	542	R*	5.97	R*	27.8	R*
Radium-226	0.37	R	0.34	R	NA		NA	
Tritium	4100	R*	4200	R*	NA		NA	
Strontium-90	0.44	R	1.35	R*	1.31	R*	2.65	R*
Total Uranium	0.82	R*	1.9	UR	0.37	R*	0.45	R*
Technetium-99	3620	R	3530	R	13.9	UR	48.1	R*
Plutonium-238	1.5	UR	1.5	UR	0.09	R	0.1	R
Plutonium-239	1.5	UR	0.87	R*	0.09	UR	0.09	UR

NA - not analyzed.

## Date Printed: 23-MAR-1992 13:58

## Oak Ridge K-25 Site Analytical Chomistry Department Results of Analyses

Analis ID: 910403-102

102 Project: G132 001C

Customer Sample ID: 800FH5

Customer: KESSNER/BUTCHER . Requisit

Requisition Number:

Date Sample Received: 31-MAR-1991 Date Sample Completed: 19-MAR-1992

Sampled By: Haterial Description: WATER

Date Sampled: 27-MAR-1991

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	C Quai	Limit of Error	Units	Analyst	QA File Number	Date Completed
***********								
***** Radioch	nemistry Laboratory *****							
EC-134	Cesium-137	2.44	K.	+/- 3.7	pCi/L	900028	ENV-523	7-JUN-1991
EC-134	Cobalt-60	1.20E1	KK	+/- 3.6E0	pCi/L	DK NANN '		
EPA-900.0	Alpha Activity	2.30.	سستهيئته	+/- 1.4 丁	pCi/L	900028	ENV-523	23-HAY-1991
EPA-900.0	Beta Activity	5.88E2	RA	+/- 15.1	pCi/L	900028	ENV-523	23-HAY-1991
EPA-903.0	Radium	0.37.19	·	E+/37	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-905.0	Tritium	4.1E3	PRSI	+/- 6.1E2	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
EPA-906.0	Strontium	0.44	4	+/- 0.8	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	0.82		+/- 2.0	pCi/L	900028	ENV-523	30-KAY-1991
TP-1628	Technetium-99	3.62E3-	in the second	+/- 1.6E3 K	pCi/L	900028	ENV-523	16-NAY-1991
TP-1635	Plutonium	NA		+/-	pCi/L	900028	ENV-523	30-NAY-1991
TP-1635	Plutonium-238	1-5-0.00	<del>ir</del> UK	+/- 1.5	pCi/L	900028	ENV-523	30-HAY-1991
TP-1635	Plutonium-239	/. 5 -0 <del>.0</del> 0.	WUR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991

Pr 'BNA- CLP)

pH

= (

Date Extracted = 7-APR-1991 Sample Volume Extracted (mL) = 1000.0

Extraction Method = Separatory Funnel
Extraction Solvent = Methylene Chloride

Extraction Cleanup = Sodium Sulfate

Final Volume of Extract (mL) = 1.0

Associated Blank = 910408-252

Prep (Pest- CLP)

pH ≈ 7

Date Extracted = 7-APR-1991

Sample Volume Extracted (mL) = 1000.0

Extraction Method = Separatory Funnel Extraction Solvent = Methylene Chloride

Extraction Cleanup = Sodium Sulfate

Final Volume of Extract (mL) = 10.0

Associated Blank = 910408-150

Replicate Results of Analysis

Replicate
Auatysis Results Results RPD
Technetium-99 3.62E3 4.6E3 23.8

1-19-93

LX - letested and constituelly rejected fue to missing data.

UK - Undetested and conditionally rejected dise to missing data.

Med 1/25/93

## Spike Recovery Data

rlysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** UnKnown Lab ****					-	
CYANIDE	0.017	0.10	0.13	mg/L	0.11	113.0
PLUTONIUM-238		21306	18400	pCi/L	18400.	86.4
PLUTONIUM-239		21306	18400	pCi/L	18400.	86.4
TOTAL ORGANIC CARBON (TOC)	0	5	4	mg/L	4.	80.0
URANIUM ALPHA ACTIVITY	0.82	675	648	pCi/L	647.	95.9

## Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Date Printed: 23-MAR-1992 13:58

Analis ID: 910408-029

Project: G132 001C

Customer Sample ID: 800F94

Customer: KESSNER/BUTCHER

Date Sampled: 3-APR-1991

Requisition Number: Date Sample Received:

5-APR-1991

Sampled By:

Date Sample Completed: 19-MAR-1992

Material Description: WATER

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No	- Analysis	Result Q Qual	Limit of Error	ปกรีts	Analyst	QA File Number	Date Completed
**** Radio	chemistry Laboratory *****	**** ******** ******					
EC-134	Cesium-137	0.93	+/- 3.3	pCi/L	900028	ENV-523	7-JUH-1991
EC-134	Cobalt-60	1.53E1 (2)	+/- 3.5E0	pCi/l	DK MANN		
EPA-900.0	Alpha Activity	2.49	+/- 1.4 丁	pCi/L	900028	ENV-523	23-MAY-1991
EPA-900.0	Beta Activity	5.42E2 17 #	+/- 14.5	pCi/L	900028	ENV-523	23-HAY-1991
EPA-903.0	Radium	0.34 .34 FUR	+/34 R	pCi/L	DS VAUGHN	ENV-523	4-HAY-1991
EPA-905.0	Tritium	4.2E3 ┌≯	+/- 6.2E2	pCi/L	DS VAUGHN	ENV-523	4-HAY-1991
EPA-906.0	Strontium	1.35	+/- 0.9	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
IHA-485	Uranium Alpha Activity	1-9 0.00 XHR	+/- 1.9UR	pCi/L	900028	ENV-523	30-MAY-1991
TP-1628	Technetium-99	3.53E3+~~	+/- 1.6E3	pCi/L	900028	ENV-523	16-HAY-1991
TP-1635	Plutonium	NA	+/-	pCi/L	900028	ENV-523	30-MAY-1991
TP-1635	Plutonium-238	15 0.00 FUR	+/- 1.5	pCi/L	900028	ENV-523	30-HAY-1991
TP-1635	Plutonium-239	0.87 RX	+/- 1.2	pCi/L	900028	ENV-523	30-MAY-1991

#### (BNA- CLP)

Date Extracted = 11-APR-1991

Sample Volume Extracted (mL) = 1000

Extraction Method = Separatory Funnel **Extraction Solvent** ≥ Methylene Chloride Extraction Cleanup = Sodium Sulfate

Final Volume of Extract (mL) = 1.0

Associated Blank = 910411-095

Prep (Pest- CLP)

рΗ **=** 6

= 9-APR-1991 Date Extracted

Sample Volume Extracted (mL) = 1000

Extraction Method Separatory Funnel Extraction Solvent = Methylene Chloride Extraction Cleanup = Sodium Sulfate

Final Volume of Extract (mL) = 10.0

Associated Blank = 910409-040 E 1-19-43

RA - Analyte detected but andihously rejected dire to winej data UR - Analyte undetected but Conditionally rigital ducko Minny data

## Replicate Results of Analysis

	Replicate						
Analysis	Results	Results	RPD				
	*******						
Uranium Alpha Activity	0.00	0	0.0				
Plutonium-238	0.00	0	0.0				

## Spike Recovery Data

ysis.	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** UnKnown Lab *****						
CYANIDE	0.038	0.1	0.147	mg/L	0.109	109.0
TECHNETIUN-99	3.53E3	12420	16600	pCi/L	13070.	105.2

## Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Date Printed: 25-FEB-1992 09:27

Analis ID: 910412-211

Project: G132 0201

Customer Sample ID: 800J75

Customer: KESSNER

Requisition Number:

Date Sampled: 1-APR-1991

Sampled By:

Date Sample Received: 6-APR-1991

Material Description: SOIL

Date Sample Completed: 24-SEP-1991

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result G Dual	Limit of Error	Units	Analyst	QA File Number	Date Completed
**** Spectro	chemistry Laboratory ***	***					
	Selenium	******		ug/Kg	29175	10427A	27-JUN-1991
**** Inducti	vely Coupled Plasma Labo	ratory ****					
EPA-3050	Bismuth	<10.0		mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7							
**** Radioch	emistry Laboratory *****	,					
EC-134	Cesium-137	2.93 RX	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.26 PX	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	5.97 iZ₩	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.31 R4	+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	<b>Branium Alpha Activity</b>	3.66E-1 R₩	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	13.9 -1.54 RUR	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.09 2.58E-2 X HR	+/- 8.9E-2 R		SM KINNEBREW	ENV-534	6-JUN-1991
⁷ '35	Plutonium-239	0109 2.585-2 RUR		pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	mistry Laboratory ****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA.	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1		ug/g	900019	91-29	20-HAY-1991

#### Spike Recovery Data *************

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
					*******	*******
NITRATE	0	100	99	ug/g	99.	99.0
ORTHO PHOSPHATE IC	0	100	88	ug/g	88.	88.0
SULFATE	0	200	176	ug/g	176.	88.0

Me 2/1/93

## Date Printed: 25-FEB-1992 09:28

## Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Analis ID: 910412-212

Project: G132 0201

Customer Sample ID: BOOJ76

Customer: KESSNER

Date Sampled: 1-APR-1991

Requisition Number:

Sampled By:

Date Sample Received: 6-APR-1991 Date Sample Completed: 24-SEP-1991

Material Description: SOIL

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

		• •				•	
Procedure No.	Analysis	Result Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
**** Spectre	ochemistry Laboratory ****	:				+-	
•	Selenium			ug/Kg	29175	10427A	27-JUN-1991
**** Inducti	ively Coupled Plasma Labor	ratory ****					
EPA-3050	Bismuth	<10.0		mg/Kg	EA HESTER -	10716B	16-JUL-1991
EPA-200.7							
**** Radioch	memistry Laboratory *****						
EC-134	Cesium-137	20.22 RX	+/~ 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	3.27 PX	+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80 PX	+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65 RX	+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-HAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1 RX	+/- 2.2E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10 ¦⊋ <del>s∕</del>	+/- 15.3	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0,1 0.00 XHR	+/- 1.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
<b>,</b> 35	Plutonium-239	0.09 -2.58E-2 XUK		pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	mistry Laboratory *****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20	į	ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1		ug/g	900019	91-29	20-HAY-1991

105-18-93 100-11/43

## APPENDIX B

## DATA REVIEW SUPPORTING DOCUMENTATION

SDG: B00J75

Samples: B00J75, B00J76

## CONTAINS:

ATTACHMENT 1 - GLOSSARY OF DATA REPORTING QUALIFIERS

ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS

ATTACHMENT 3 - AS QUALIFIED LABORATORY DATA

ATTACHMENT 4 - DATA VALIDATION SUPPORTING DOCUMENTATION

### ATTACHMENT 1

## GLOSSARY OF DATA REPORTING QUALIFIERS

- B- Indicates tha compound or analyte was analyzed for and detected. The value reported is less than the CRQL but greater than the IDL.
- U- Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.
- UJ- Indicates the compound or analyte was analyzed for and not detected. Due to an identified quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.
- J- Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are usable for decision making processes.
- R- Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.
- NJ- Indicates presumptive evidence of a compound at an estimated value.
- N- Indicates presumptive evidence of a compound.

# ATTACHMENT 2 SUMMARY OF DATA QUALIFICATIONS

## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: KOOT75		DATE: 9-/7-9.2	PAGE_/OF/
COMMENTS:	wry arriver		-
COMPOUND .	QUALIFIER	SAMPLES AFFECTED	REASON
CN	R	ROOJ754 BOOJ761	
Bí	R	BOOT 751, BOOT 76A	lange le spike
Se	UJ	BOOT75ABCOT76A	recovery 4302
		noon square	4.995
		<u> </u>	

## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: Ran 575	REVIEWERS, Schild	-DATE: 9 /7 92	PAGE /OF /
COMMENTS:	, -c. (a)		
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
NO2, PO4, Soy	UJ	B005755, B00576	Holding time
4457 73 97 C			exceeded
			,
	· · · · · · · · · · · · · · · · · · ·		

# ATTACHMENT 3 AS QUALIFIED LABORATORY DATA

BOOJ75A

INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

B 00 75

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFHS

Matrix (soil/water): SOIL

Lab Sample ID: 910412-21

Level (low/med): LOW

Date Received: 04/06/91

% Solids:

97.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	С	Q	м	
			-  -		NR NR	
			_ 		NR NR	م
	Bismuth	10.2	<u>u</u>	<u>N</u>	NR NR	R
			_		NR NR	
			=		以 京 京 京 京 京 京 京 京 京 京 京 京 京	
			-  -		NR NR NR	
			_		NR NR	
			_		NEW NEW NEW NEW NEW NEW NEW NEW NEW NEW	
			_		MR MR NR	

Color Before: BROWN

Clarity Before: CLEAR

Texture:

Color After: LT. GREEN

Clarity After: CLEAR Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910412-211

## 1 INORGANIC ANALYSES DATA SHEET

EPA	SAMPLE	NO
-----	--------	----

Lah Name: MART	TN MARTETTA	K25 STTE	Contract: HI	NEC	מאר	BOOJ75	
							/
Lab Code: K25A	CD Car	se No.:	SAS No.:	:		SDG NO.: 1	300075
Matrix (soil/w	ater): SOIL	<del>-</del>		Lak	Sampl	e ID: 91043	12-211
Level (low/med	): LOW	_		Dat	ce Rece	eived: 04/06	5/91
₹ Solids:	_97.	5					
Co	ncentration	Units (ug,	/L or mg/kg dry	y we	eight):	MG/KG	
	CAS No.	Analyte	Concentration	c	Q	м	
				_ _			1
	7429-90-5			- -		NR	
		Antimony_ Arsenic		- -	<del></del> [	NR	
	1	Barium		- -		NR NR	
		Beryllium		- -		NR NR	
		Cadmium		- -		NR	
		Calcium		- -		NR	
	<b> </b>	Chromium		- -		NR	
		Cobalt		- -		NR	
		Copper		- -	·	NR	
		Iron		- -	<del></del>	NR	
		Lead				NR	
		Magnesium		_ -		NR	
		Manganese		_ -		NR	
		Mercury		_ -		NR	
		Nickel		_ -		NR	
		Potassium		}-		NR F 以 ゴ	
		Selenium_	0.41	- ا	WN	F_   ^{IA S}	
		Silver		- -		NR	
		Thallium		- -		NR NR	
		Vanadium		-		NR	
	7440-66-6	Zinc		-		NR	
	/ 2 2 0 0	Cyanide		-		NR	
Color Before:	BROWN	Clari	ty Before:	<del></del>		Texture:	COARSE
Color After:	BROWN	Clari	ty After:			Artifacts:	YES
Comments: ROCKS		*					
	<del></del>						<del></del>

190 Hligh

FORM I - IN

	ı	NORGANIC A	l NALYSIS DATA S	HEET	EPA SAMPLE NO.
Lab Name: Ma	rtin Mariet	tc	Contract: _		BOOT 7 5A
Lab Code: Ka	<u>5</u> Cas	se No.:	SAS No.		SDG No.: Boos?
Matrix (soil/v	water): Soil	<u> </u>		Lab Samp	le ID: 9/04/2-2//
Level (low/med				Date Rec	eived: 4/6/91
	97.5	<del></del>			- <del></del> -
ዩ Solids: Co		<del></del>	L or mg/kg dry	weight):	<u>ma/k</u> a .
	CAS No.	Analyte	Concentration	ici Q	M
	7440-38-2   7440-39-3   7440-41-7   7440-43-9   7440-47-3   7440-48-4   7440-50-8   7439-89-6   7439-92-1   7439-95-4   7439-96-5   7439-97-6   7440-02-0   7440-09-7   7782-49-2	Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Cobalt Copper Iron Lead Magnesium Manganese Mercury Nickel Potassium Selenium Silver Sodium Thallium			
Color Before:	<del></del>	Clari	ty Before:	<del></del>	Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:					

3/90 Halir

## ENVIROFORMS/CLP 788

## INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

- Contract:

BOOJ76A Near Surface 17

Lab Code: K25 Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): SOIL

Lab Sample ID: 910412-212

Level (low/med): LOW

Date Received: 04/06/91

% Solids:

94.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	С	Q	м	
			<u>-</u>		NR NR	
			_		NR NR	
	Bismuth	10.0	<u>y</u>	<u>N</u>	P NR	R
			_		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
			_		                         	
			  -		NR NR NR	
			_		NR NR	
			-  -		NR NR	
			-  -		NIN NIN NIN NIN NIN NIN NIN NIN NIN NIN	

Color Before: BROWN

Clarity Before: CLEAR Texture:

Color After: LT. GREEN

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910412-212

## 1 INORGANIC ANALYSES DATA SHEET

		<del>.</del>	•
EPA	SAMPLE	N	iO.

Lab Name: MARTIN_MARIETTA_	_K25_SITE_	Contract: H	ANFORD	BOOJ76A Near Surface 17 dup
Lab Code: K25ACD Cas	se No.:	SAS No.:		SDG No.: BOOJ75
Matrix (soil/water): SOIL_	_		Lab Sampl	e ID: 910412-212
Level (low/med): LOW	_		Date Rece	ived: 04/06/91
% Solids: _94.9	e			
Concentration	Units (ug/	L or mg/kg dry	y weight):	MG/KG
CAS No.	Analyte	Concentration	C Q	M
7429-90-5 7440-36-0 7440-38-2 7440-39-3 7440-41-7 7440-43-9 7440-70-2 7440-47-3 7440-48-4 7440-50-8 7439-89-6 7439-92-1 7439-95-4 7439-96-5 7439-97-6 7440-02-0 7440-02-0 7440-02-2 7440-22-4	Aluminum_ Antimony_ Arsenic_ Barium_ Beryllium Cadmium_ Calcium_ Chromium_ Cobalt_ Copper_ Iron_ Lead_ Magnesium Manganese Mercury_ Nickel_ Potassium Selenium_ Silver			NR NR NR NR NR NR NR NR NR NR NR NR NR N
7440-23-5 7440-28-0 7440-62-2 7440-66-6	Sodium			NR NR NR NR

COTOT	perore:	BROWN	Clarity	Belore:	<del></del>	rexture:	CUAR
Color	After:	BROWN	Clarity	After:		Artifacts:	YES_
Commer RO	nts: CKS						
		***************************************					

FORM I - IN

190 Hall

		U.S.	EPA - CLP	-	14
	I	NORGANIC AL	l Nalysis data si	HEET	EPA SAMPLE NO.
Lab Name: May			Contract:		BOUT 76A Near Surface 17 day
Lab Code: K25	<u> </u>	se No.:	SAS No.:	·	SDG No.: 800775
Matrix (soil/wa	ter): <u>Soi</u>	<u> </u>			le ID: 9/04/3. 2/3
Level (low/med)	100	ے <del>_</del>		Date Rece	eived: 4/6/91
% Solids:	94.9	7			
Con	centration	l	L or mg/kg dry Concentration		mg/Ks
	7429-90-5 7440-36-0 7440-38-2 7440-39-3 7440-41-7 7440-43-9 7440-47-3 7440-48-4 7440-50-8 7439-89-6 7439-95-4 7439-95-4 7439-96-5 7439-97-6 7440-02-0 7440-09-7 7782-49-2 7440-22-4	Aluminum Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Cobalt Copper Iron Lead Hagnesium Hanganese Hercury Nickel Potassium Selenium Silver Sodium	< O . 1		
Color Before:	•	Clari	ty Before:		Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:					

## 1-1 INORGANIC ANALYSES DATA SHEET WET CHEMISTRY

	Oak Ridge F Analytical		Department	Contrac		nghouse rd Company	Y
Matrix (so	oil/water):	Soil	_ SI	DG#:P	300J75	· · · · · · · · · · · · · · · · · · ·	
ACD Sample ID Number:	910412-2	211	Custome Sample Da	ID: H	300J75 <u>A</u> <i>Near surf</i> Sived: 6	Ace /3 o April 199	lup 1

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	N/A			<u> </u>
Ammonia	N/A			
Bromide	N/A			•
Chemical O2 Demand	N/A			-
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate	<20UJ	ug/g	91-44IA	21-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	N/A			
Nitrite Nitrogen	N/A			l
Ortho Phosphate	<20UJ	_ug/g	91-44IA_	
Sulfate	<20 UD 64,755°C	_ug/g	_91-44IA_	21-Apr-91
Total Organic Carbon	N/A			
Total Organic Halides_	N/A		.]	[[
Turbidity	N/A			i
pH	N/A			
			.	
				[
			·	
	<u> </u>	l	.	! <u></u>

Comme	ents:							
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_			<del></del>	 	 		 	 
_				 	 	 	 	 

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## 1-2 INORGANIC ANALYSES DATA SHEET WET CHEMISTRY

	Γ	ate Rec		Face 17 dup 6-April-1991
Analyte	Concentration	Units	Batch No.	Date of Analysi
			.	
Alkalinity	N/A		.	
Ammonia	N/A_		.	<u> </u>
Bromide	N/A		.	
Chemical O2 Demand	N/A		.	
Chloride IC	N/A			
Conductivity	N/A			
Dissolved Solids	N/A			
Fluoride SIE	N/A			
Nitrate	<20 UJ	_ug/g	91-44IA_	21-Apr-91
Nitrate Nitrogen	N/A			
Nitrite	N/A			
Nitrite Nitrogen	N/A			
Ortho Phosphate	<20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT - 20 UT	ug/g	91-44IA	21-Apr-91
Sulfate	<20 UJ 54,2375	_ug/g	91-44IA	21-Apr-91
Total Organic Carbon	N/A		_	
Total Organic Halides_	N/A		_	
Turbidity	N/A		"	
T Hq	N/A		.	
			-	
			-	

Allar

## ATTACHMENT 4 DATA VALIDATION SUPPORTING DOCUMENTATION

## WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200-B P-1	REVIEWERS Soli It	- DATE	: 9-17	7-92
LABORATORY: Martin Marietta K.25	CASE:	SDG:	BODS	T75
SAMPLES/MATRIX: BODJ 75A, BOD	7 : 1	=		
SOLO POLITICA	0.70.7.7	<del></del>		<del></del>
				····
DATA PACKAGE COMPLETENESS				
1. DATA PACRAGE COMPLETENESS				
Review the data package for completeness and chec		any dat	а гeview	,
elements are missing contact the laboratory for sub	mittal of the omitted data.			
Data Package Item	Present?:	Yes	No	N/A
Case Narrative		/		
Cover Page		<u> </u>	~	
Traffic Reports/Chain-of-Custody		$\overline{Z}$		
Sample Analysis Data Report Forms		<u> </u>		
Standards Data				
QC Summary				
Blanks Summary Report Forms				
Spike Sample Recovery Report Forms				
Duplicate Sample Analysis Report Forms		_	<u> </u>	
Laboratory Control Sample Report Forms				
Raw Data		_		
Ion Chromatograph Chromatograms				
TOC and TOX instrument Printouts				
Laboratory Bench Sheets				
Additional Data				
Laboratory Sample Preparation Logs				<u> </u>
Instrument Run Logs				
Internal Laboratory Chain-of-Custory		4	<u></u>	
Percent Solids Analysis Records				_
Reduction Formulae				
Chemist Notebook Pages	•		_	
2. HOLDING TIMES				
a. Tromputo thim				
Were all samples analyzed within holding times?		Yes	No	N/A

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

### 3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used?

No N/A

Are the correlation coefficients  $\geq 0.995$ ?

No N/A

No

No

Was a balance check conducted prior to the TDS analysis?

Yes

Was the titrant normality checked?

Yes

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

## 4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency?

No N/A

Are ICV and CCV percent recoveries within control?

No N/A

Are there calculation errors?



N/A

ACTION: Qualify all affected data in accordance with the validation requirements.

### 5. LABORATORY BLANKS

Are target analytes present in the laboratory blanks?

Yes



N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U) and list the affected samples and analytes below.

### 6. FIELD BLANKS

Are target analytes present in the field blanks?

Yes



ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

### 7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits?

N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are > CRQL, qualify the data as estimated (J). If the spike recovery is <30% and the sample results are less then the IDL qualify the data as unusable (R).

## 8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits?

Yes No

NIA)

Are there calculation errors?

Yes No

N/A

ACTION: Qualify the affected results according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for which the LCS %R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R < 50%.

SOLID LCS - Qualify as estimated (I), all sample results > IDL for which the LCS %R is outside the established control limits. Qualify as estimated (UI), all sample results < IDL for which the LCS %R are lower than the established control limits.

## 9. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits?

Yes No



ACTION: Note the results of the performance audit samples in the validation narrative.

## 10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits?

(Yes)

Jo

N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

### 11. FIELD DUPLICATE SAMPLES

Do RPD values exceed the acceptance limits?

Yes No



ACTION: Note the results of the field duplicate samples in the validation narrative.

## 12. FIELD SPLIT SAMPLES

Do RPD values exceed the acceptance limits?

Yes No



ACTION: Note the results of the field split samples in the validation narrative.

## 13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?

N/A

Are instrument detection limits below the CRDL?

N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

## 14. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

No N/A

Were project specific data quality objectives met for this analysis?

No

N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

SDG: <i>Booj75</i> COMMENTS:	REVIEWER:	S. Schi	latt "	DATE: 9-/	7-92		PAGE_/_OF_/_
COMMENTS:	Wet Cl	remestr	7	<u> </u>	· _ · · · · · · · · · · · · · · · · · ·		
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOOJ 75A	NOz	4-1-91		4-21-91		20	J
1	P04						15
	504						- ionie
BOOT 76A	NO3						15
	POY						1
c-	504					سله	Linoue
	•						
	•	i					•
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WHC-SD-EN-SPP-002, Rev. 1

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWERS Schild DATE: 9-17-92
LABORATORY: Martin Marietta K-25	CASE: BOOT 75 SDG: BOOT 75
SAMPLES/MATRIX: BOO J 75k BOO	J76R/soil
1	

#### 1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative		<u>~</u>		
Cover Page		<u> </u>		
Traffic Reports		_		
Sample Data	•			
Inorganic Analysis Data Sheets		<u> </u>		
Standards Data				
Initial and Continuing Calibration Verification CRDL Standard for AA and ICP		<u>/</u>		
QC Summary				
Blanks		<u>/</u>		
ICP Interference Check Summary				
Spike Sample Recovery				,
Post-Digestion Spike Sample Recovery				
Duplicate		7		
Laboratory Control Sample				
Standard Addition Results				
ICP Serial Dilutions		NYKKNI		
Instrument Detection Limits		<u></u>		
ICP Interelement Correction Factors		<u> </u>		
ICP Linear Ranges				
Preparation Log				
Analysis Run Log		کی۔		
Raw Data		_		
ICP Raw Data				
Furnace AA Raw Data				
Mercury Raw Data				
Cyanide Raw Data				
Additional Data				
Internal laboratory chain-of-custody				
Laboratory Sample Preparation Records				

Data Package Item	Present?:	Yes	No	N/A
Percent Solids Analysis Records Reduction Formulae Instrument Run Logs Chemist Notebook Pages		<u>/</u>	<u>Z</u>	
2. HOLDING TIMES				
Have all samples been analyzed within holding times?		Yes	No	N/A
ACTION: If any holding times have been exceeded qualify detects and UI for nondetects).	all affected resu	ilts as est	imated (	J for
3. INITIAL CALIBRATIONS				
Were all instruments calibrated daily, each set-up time and were the proper number of standards used?		Yes	No	N/A
Are the correlation coefficients ≥0.995?		Yes	No	N/A
Was a midrange cyanide standard distilled?		Yes	No	N/A
ACTION: Qualify all data as unusable if reported from an a calibrated or was calibrated with less than the minimum num sample results > IDL as estimated (I) and results < IDL as e coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the minimum of the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory did not distill the coefficient is < 0.995 or the laboratory	iber of standard estimated (UI),	s. Qualif	y associa relation	
4. INITIAL AND CONTINUING CALIBRATION VERIFI	CATION			
Are ICV and CCV percent recoveries within control?		Yes	No	N/A
Are there calculation errors?		Yes	No	N/A
ACTION: Qualify all affected data in accordance with Secticalculation errors are noted, contact the laboratory for clarification.		alidation	requirem	ents. If
5. ICP INTERFERENCE CHECK SAMPLE				
Has an ICS sample been analyzed at the proper frequency?		Yes	No	N/A
Are the AB solution %R values within control?		Yes	No	N/A
Are there calculation errors?		Yes	No	N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

#### LABORATORY BLANKS

Are target analytes present in the laboratory blanks?

No

N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are > CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations < 10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

#### 7. FIELD BLANKS

Are target analytes present in the field blanks?

Yes



ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

#### 8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits?

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is > 125% and sample results are < IDL no qualification is required. If spike recovery is > 125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

#### 9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits?



N/A

Are there calculation errors?

N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (I), all sample results > IDL, for which the LCS %R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (I), all sample results > IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results < IDL for which the LCS %R are lower than the established control limits.

#### 10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits?

Yes No

N/A)

ACTION: Note the results of the performance audit sample analyses in the data validation narrative.

#### 11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable?

Yes

No

N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

#### 12. ICP SERIAL DILUTION

Are the serial dilution results acceptable?

Yes

No

N/A

Is there evidence of negative interference?

Yes

No

N/A

ACTION: Qualify the associated data as estimated (I) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

#### 13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits?

Yes

No

N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

#### 14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits?

Yes No

N/A

ACTION: Note the results of the field split samples in the validation narrative.

#### 1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections?

Yes

No N/A

Are applicable duplicate injection RSD values within control?

Yes

No

N/A

If no, were samples rerun once as required?

Yes

No

N/A)

Does the RSD for the rerun fall within the control limits?

Yes

No

N/A

Were analytical spike recoveries within the control limits?

Yes

No

N/A

If no, were MSA analyses performed when required?	Yes	No NA
Are MSA correlation coefficients ≥0.995?	Yes	No N/A
If no, was a second MSA analysis performed?	Yes	No N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (I for detects and UI for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (I). If the analytical spike recovery is <10%, reject all nondetects as estimated (UI) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (I for detects and UI for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (I).

#### 17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes No	N/A
Are all detection limits below the CRQL?	Yes No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

#### 18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes No	N/A
Were project specific data quality objectives met for this analysis?	Yes No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

CON	MENTS	(attach ad	ditional sh	neets as nec	essary):				
1.	No	cuan	iale.	listel	latimi	loa	provid	e.	
						11	provid		_
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<u> </u>	1 1	ing.	any	( , &	randa	rd il	sed for	_ cyanu	<u> </u>
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## HOLDING TIME SUMMARY - FORM B-1

REVIEWER:	S. Sch	Oob+	DATE: 9-1	7-92		PAGE . / OF /
Imorga	nies					
ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
$\mathcal{B}_{i}$	4-1-91	7-14-91	7-16-91	104	106	none
5e		6-10-91	6-27-91	70	87	noue
CN	1	WA	5-20-91	NA	50	J
		-				
•						
<u></u>						
	ANALYSIS TYPE  Bi  Se	ANALYSIS DATE TYPE SAMPLED  B: 4-1-91  Se	ANALYSIS DATE SAMPLED PREPARED  B: 4-1-91 7-14-91  Se   6-10-91	ANALYSIS DATE DATE PREPARED ANALYZED  B: 4-1-91 7-14-91 7-16-91  Se   6-10-91 6-27-91	ANALYSIS DATE DATE DATE HOLDING TYPE SAMPLED PREPARED ANALYZED TIME, DAYS  B: 4-1-91 7-14-91 7-16-91 104  Se   6-10-91 6-27-91 70	ANALYSIS DATE DATE PREPARED DATE HOLDING TIME, DAYS  B: 4-1-91 7-14-91 7-16-91 104 106  Se   6-10-91 6-27-91 70 87

ħ

SDG: B50 J 7.5	REVIEWER: S Schillt	DATE: 9-17-92.	PAGE_	/_OF
COMMENTS: Sech	e Sangale Recovery	(ICH)		
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
BOOJ765	Birmeth	9.9	BOOTF GA BOOTFS	t K
				,

## BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: BTO J75 REVIEWER: 5 Schilott  COMMENTS: Inorganics					DATE: 4-17-92			PAGE ( OF /	
COMMENTS: Inorganies									
SAMPLE ID	СОМРОИМО	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB2	Se	-2.1	B	<del> </del>	Mg/Kg	10.5		None	
	·								

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#### APPENDIX B

#### DATA VALIDATION DOCUMENTATION

SDG: B00FH5

SAMPLES: B00FH5, B00FH6, B00F94, B00F95

#### **CONTAINS:**

ATTACHMENT 1 - GLOSSARY OF DATA REPORTING QUALIFIERS

ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS

ATTACHMENT 3 - AS QUALIFIED LABORATORY DATA

ATTACHMENT 4 - DATA VALIDATION SUPPORTING DOCUMENTATION

#### ATTACHMENT 1

#### GLOSSARY OF DATA REPORTING QUALIFIERS

- B Indicates the compound or analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL).
- U Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.
- UJ Indicates the compound or analyte was analyzed for and not detected. Due to identified quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.
- J Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are usable for decision making processes.
- R Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.
- NJ Indicates presumptive evidence of a compound at an estimated value.
- N Indicates presumptive evidence of a compound.

# ATTACHMENT 2 SUMMARY OF DATA QUALIFICATIONS

## DATA QUALIFICATION SUMMARY - FORM B-7

SDG: GOOFHS	REVIEWER:	DATE: 6/15/42	PAGE / OF
COMMENTS:	WAA	5/1.5/	
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	45	BODFH5	Holding
			Time.
Acedons	UJ	ROUF 94	Cal Tol
12 And lowellow		/	725
Carter Tet.			
Vinus Levate			
Bannodedeloro			
reture			
Trans 13 Milion	o		<u> </u>
Properse			
Behrowschlow	,		
nulane.		1	;
113 TCA	,	7	-
Ermotom	(		Ĺ
4-11-2-Pent	<u> </u>		+ /
			$\checkmark$
Actore	U	ROOF94	Mesert in
2-Hexavore	/		Manh
1122. TCA	. ://		7
2-Bulanoul	UT	BOOFHS	Ilal 9, 830>30
Actore Actore ?-Kutanone	/	1300 FG4	1
Accord	/ .	1300FH5	ccal %0725
?- Exclavare	/ ,		/
2-Herauore		U	

115/10

SDG: 1300 FHS	REVIEWER: MAN	DATE: 8/15/92	PAGE_/_OF	
COMMENTS:	SNA		_	
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON	
2.4.5-Tricklard	UT	1500 FHS	Clas 120>25	,
pherol				
			ICA (1820)20	let 1
Bis-Ce-chlorocky lother	115	BONF94	Told Holling	16.15 E
3-Nitroaniline	45	11	//	-
Dicter forholote	4.5			
4 Allore down	MJ			
shoul other				
Fluorene	UT	11/		
		_		
2,45-Trickler	UT	1BFAFG4	Club 10	
pres		/	>25	
Allow plany -	UT	- /	-	
phylip other				
46-Pinitor-2-	4J		<u> </u>	1
wethy phanol				
	117	um EUC	6/1/20	
-4//	MJ	BOOTHS	142/ain 9	
		Marst 1301011 17	Times	1
			Missel	
			for Reg.	
·				
Pracetore Alder	R	000F94	Suspect	
			Lab. lacturing	k T

SDG: BEAFAS	REVIEWER:	DATE: 8/17/92	PAGE / OF /
COMMENTS:	Pest 11	2/B	
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
A11	UT	BOUFHS	Holding
			Tines
			Missel
	<del> </del>		
		·	•
		<u>-</u>	
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SDG: BODFH5	REVIEWER: LAS	DATE: 8/15/92	PAGE_/OF
COMMENTS: //	hetals/CM		
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chanide	R	A11	Halling
/			Time excelent
Bismuda	R	A11	Spike Tok
Tim	R	A-11	165 %R <50%
Sodium	J	AII	ICP Send
A huningun	U	\$11	To D >10%
FROM	U	BOTFH 6	Blandes
		1300 FGS	
Malliner	EXECUTION INT	B00FH6	GFAA Fake
Sclenium	UT	100 F94	GFAA Sprke Jak 285/p

SDG: BOOFHS	REVIEWER: KMA	DATE: 8/15/92	PAGE _ OF
COMMENTS: A	ut Chemis	tuy	-
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Conductivity	J	GOOF HS	Holding
TOX	/		Time
Turkedity		/	
phi 1	<i>J</i>	<i>V</i>	
Conductivity	T	BOTTELL	Holding.
Flouride	J		Time
Nitrale	J		. /
Nitoite	WJ		
TOX	UJ		
Turkidily	J		
12/t- 1			<i></i>
767	<u> </u>	Part FHS	- ZK <75%
·		THE THE	7217 713 (1)
7/5	J.	PODF145	Holding
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·			<u> </u>
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## ATTACHMENT 3 AS QUALIFIED DATA SUMMARY

#### 1A VOLATILE ORGANICS ANALYSIS DATA SHEET

| BOOFH5

EPA SAMPLE NO.

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-00165AS No.: NA

SDG No.: BOOFH5

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 5

5 (g/mL) ML

Lab File ID: >08657

Level: (low/med) LOW

Date Received: 3/31/91

% Moisture: not dec. NA

Date Analyzed: 4/05/91

Column: (pack/cap) CAP

Dilution Factor: 1.00000

		CONCENTR	ATION UN	IITS:		
CAS NO.	COMPOUND	(ug/L or	ug/Kg)	UG/L	Q	
7/ 07 7				1.0	14	
74-8/-3	Chloromethane_		<b>—</b> !	10. 10.	10	
74-83-7	Bromomethane		!	10.	IU	: <i>X</i>
/7-U1-4	Vinyl Chloride	·	<del></del> !		18	://
/9-UU-3	Chloroethane_		<del></del> !	10.		: 1
/5-09-2	Methylene_Chlo	ride	<u>'</u>	<del>5</del> .	10	- ' 1⁄
6/-64-1	Acetone Carbon Disulfi		<del></del> !	10.	14-47	14
フ <b>ラー1</b> ラー0	Carbon Disulfi	.de	<del></del> !	5.	IU	!
75-35-4	1,1-Dichloroet	hene	<u></u> !	5.	1U 1U	11
79-34-3	1,1-Dichloroet 1,2-Dichloroet	hane	<del></del> -!	5. 5.	10	:X
740-77-0	1,2-Dichloroet	nene_(total)	<del></del>			17
6/-66-3	Chloroform_ 1,2-Dichloroet		<del></del> !	5. ~	10	11
107-06-2	1,2-Dichloroet	hane	<del></del> !	5.	10	-!
78-93-3	2-Butanone	<del></del>	<b>—</b> !	10.	+4-43	! X
71-55-6	1,1,1-Trichlor	oethane	<u></u> '	5.	ΙU	!'
	Carbon Tetrach			5.	ΙU	!
108-05-4	Vinyl Acetate_		<b>i</b>	10.	IU	! <i>y</i>
	Bromodichlorom			5.	ŧυ	17
78-87-5	1,2-Dichloropr	opane	i	5.	IU	1
10061-01-5	cis-1,3-Dichlo	ropropene	1	5.	I U	1
79-01-6	Trichĺoroether	1 <b>8</b>	1		IU	
124-48-1	Dibromochlorom	nethane	1	5.	IU	1 1
79-00-5	1,1,2-Trichlor	oethane	1	5.	IU	1
	Benzene			5.	IU	1 /
	trans-1,3-Dich			5.	IU	11
75-25-2	Bromoform 4-Methyl-2-per		1	5.	14	1 /
108-10-1	4-Methyl-2-per	tanone	1	10.	IU	11
591-78-6	2-Hexanone Tetrachloroeth		!	10.	NJ W3	1
127-18-4	Tetrachloroeth	nene	!	5.	١u	1
79-34-5	1,1,2,2-Tetrac	chloroethane_	1	5.	1 U	1/
108-88-3	Toluene		J	5.	ΙU	11
108-90-7	Chlorobenzene_		1	5.	ΙU	1/
100-41-4	Ethylbenzene_		1	5.	IU	1/
100-42-5	Styrene Xylene (total)		i	5.	ΙU	1/
1330-20-7	Xylene (total)	)		5.	ΙU	1/
	•				1	IV

M

5-029 Moto/15/UL

## LA VOLATILE ORGANICS AMALYSIS DATA SHEET

EPA SAMPLE DO.

EOOF94

Lab Name: MARTIMMARI	ETTA Contrac	: EOOF94
Lab Code: <u>F-25</u>	Case No.: 3130-70/4 SAS No	s.:SDG No.: BOOFHS
Matrix: (soil, water)	NATER_	Lab Sample ID: <u>910408-023</u>
Sample wt/vol:	5.0 (g/ml, wr	Lab File ID: 0408029
Level: (low/med)	LOW	Date Received: 04/05/91
% Moisture: not dec.	***************************************	Date Analyzed: 04/10/91
Column: (pack/cap)	CAP	Dilution Factor: 1.9
TAS MC.		CENTRATION UNITS: = COVE 10
755-094-1	ChloromethaneBromomethaneVinyl ChlorideChloroethaneMethylene ChlorideAcetoneCarbon Disulfide1,1-Dichloroethane1,2-Dichloroethane1,2-Dichloroethane1,2-Dichloroethane1,1-Trichloroethane2-Butanone1,1,1-Trichloroethane2-Butanone1,2-DichloropropaneCarbon TetrachlorideVinyl AcetateBromodichloromethane1,2-DichloropropaneCis-1,3-DichloropropenTrans-1,3-DichloropropenTrichloroetheneDibromochloromethane1,1,2-Trichloroethane1,1,2-TrichloroethaneBenzeneBromoform4-Methyl-2-Fentanone2-Hexanone2-HexanoneTetrachloroethene1,1,2,2-Tetrachloroeth	10 10 10 10 10 10 10 10 10 10 10 10 10 1
	PARIS T WAS	Mut 8/15/192
	AOV I MEGE	. 1/37 R

EPA SAMPLE NO. SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET **BOOFH5** Lab Name: MARTIN MARIETTA Contract: 9288 Case No.: G132-001SAS No.: NA Lab Code: K25 SDG No.: NA BOOFHS Matrix: (spil/water) WATER Lab Sample ID: 910403-102 Sample wt/vol: (g/mL) mL 1000 Lab File ID: >11281 (low/med) Level: LOW Date Received: 03/31/91 % Moisture: not dec.NA dec. NA Date Extracted: 04/07/91

(Sepf/Cont/Sonc) Extraction:

SEPF Date Analyzed: 4/11/91

GPC Cleanup: (YZN) N pH: 7.0 Dilution Factor: 1.0

BLK: 910408-252 CONCENTRATION UNITS: CAS NO. COMPOUND Q (ug/L or ug/Kg) ug/L

| 108-95-2----Phenol 10. 1 111-44-4-----bis(2-Chloroethyl)Ether__ 10. Ш | 95-57-8-----2-Chlorophenol_ 10. 111 | 541-73-1----1,3-Dichlorobenzene_ 10. IU | 106-46-7----1,4-Dichlorobenzene__ 10. 111 | 100-51-6-----Benzyl alcohol 10. IU 1 95-50-1-----1,2-Dichlorobenzene 10. IU 95-48-7----2-Methylphenol___ 10. 10 39638-32-9----bis(2-chloroisopropyi)ether_! .10. Ш | 106-44-5----4-Methylphenol_ .10. IU 1 621-64-7----N-Nitroso-Di-n-propylamine_ 10. 111| 67-72-1----Hexachloroethane____ .10. 10 | 98-95-3-----Nitrobenzene____ 10. IU | 78-59-1------Isophorone__ 10. 111 | 88-75-5----2-Nitrophenol____ 10. IL | 105-67-9----2,4-Dimethylphenol IU 10. 1 65-85-0-----Benzoic acid 50. IU 111-91-1-----bis(2-Chloroethoxy)methane_ 10. IU 1 120-83-2----2,4-Dichlorophenol_ 10. 11 1 120-82-1-----1,2,4-Trichlorobenzene 10. IU | 91-20-3----Naphthalene IU 18. 1 106-47-8----4-Chloroaniline 10. IU 87-68-3-----Hexachlorobutadiene_ 10. IU | 59-50-7----4-Chloro-3-methylphenol__ IU. 10. | 91-57-6----2-Methylnaphthalene_ 10 10. 1 77-47-4-----Hexachlorocyclopentadiene ΙU 10. | 88-06-2----2,4,6-Trichlorophenol____ 10. ш 1 95-95-4----2,4,5-Trichlorophenol 50. 111 | 91-58-7-----2-Chloronaphthalene___ 10. IU 1 88-74-4----2-Nitroaniline_ IU 50. | 131-11-3-----Dimethylphthalate____ 10. IU 208-96-8-----Acenaphthylene_ 10. IU 606-20-2----2,6-Dinitrotoluene_ 10. 10



SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

I B00FH5

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25

Case No.: G132-0015AS No.: NA SDG No.: HA BoofHs

Matrix: (soil/water) WATER

Lab Sample ID: 910403-102

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11281

Level: (low/med) LOW

Date Received: 03/31/91

% Moisture: not dec.NA dec. NA

Date Extracted: 04/07/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/11/91

GPC Cleanup: (Y/N) N pH:7.0

Dilution Factor: 1.8 Min

CONCENTRATION UNITS:

	CAS NO.	COMPOUND	(ug/L or ug/Kg	) ug/L	ū
1			[		بلس ا
į	99-09-2	-3-Nitroaniline	1	50.	H-101
1	83-32-9	-Acenaphthene		10.	10 [1
1	51-28-5	-2,4-Dinitropheno	1	5O.	10 } !
- 1	100-02-7	-4-Nitrophenol	1	50.	10 / 1
1	132-64-9	-Dibenzofuran	I	10.	10   1
- 1	121-14-2	-2,4-Dinitrotolue	ne	10.	iU l
ŀ	84-66-2	-Diethylphthalate		10.	IU I
1	7005-72-3	-4-Chlorophenyl-p	henylether	10.	10   1
1	86-73-7	-Fluorene	<u></u> 1	10.	10   1
ţ	100-01-6	-4-Nitroaniline		50.	10   1
ţ		-4,6-Dinitro-2-me		50.	U_
1	86-30-6	-N-Nitrosodipheny	lamine (1)	10.	10
1	101-55-3	-4-Bromophenyl-ph	enyletherI	10.	10 } 1
ļ	118-74-1	-Hexachlorobenzen	e	10.	10   1
1	87-86-5	-Pentachloropheno	1	50.	10   1
- 1	85-01-8	-Phenanthrene	<u> </u>	10.	10   1
1	120-12-7	-Anthracene	1	10.	10   1
ŧ	84-74-2	-Di-n-butylphthal	ate1	10.	10   1
1	206-44-0	-Fluoranthene	1	10.	10 1
-1	129-00-0	-Pyrene		10.	10   1
I	85-68-7	-Butylbenzylphtha	lateI	10.	10   1
1		-3,3 ¹ -Dichloroben		20.	10 / 1
1		-Bénzo(a)anthrace		10.	10 / 1
-		-Chrysene		10.	10 / 1
í	117-81-7	-bis(2-Ethylhexyl	)phthalate	10.	10 1
1	117-84-0	-Di-n-octylphthal	ate	10.	ו טו
1	205-99-2	-Benzo(b)fluorant	hene	10.	10   1
ı	207-08-9	-Benzo(k)fluorant	hene	10.	10   1
1	50-32-8	-Benzo(a)pyrene		10.	18 1
i	193-39-5	-Indeno(1,2,3-cd)	pyrene	10.	lu_\ t
Í	53-70-3	-Dibenz(a,h)anthr	acene	10.	10 / 1
i	191-24-2	-Benzo(g,h,i)pery	lene	10.	וט עו
i	_ · · _				_11
(	1) - Cannot be s	eparated from Dip	henylamine		

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: BOOFH5

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL Lab File ID: >11311

Level: (low/med) LOW

Date Received: 04/05/91

% Moisture: not dec.NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH:6.0 Dilution Factor: 1.0

CONCENTRATION UNITS:

	CAS NO.	COMPOUND	(ug/L or ug/K	g) ug∕L	Q
i	······································				
1	108-95-2	-Phenol		10.	1 [11]
-1	111-44-4	-bis(2-Chloroethy	1)Ether1	10.	1 1
j	95-57-8	-2-Chlorophenol		10.	141
I	541-73-1	-1,3-Dichlorobenz	enei	10.	14 1
ı	106-46-7	-1,4-Dichlorobenza	enel	10.	14 1
t		-Benzyl alcohol		10.	14 1
ŀ		-1,2-Dichlorobenz		10.	141
1	95-48-7	-2-Methylphenol	1	10.	10 1
l	39638-32-9	-bis(2-chloroisop	ropyl)ether_i	10.	HÚ ( I
1	106-44-5	-4-Methylphenol	<u> </u>	10.	10   1
1	621-64-7	-N-Nitroso-Di-n-p	ropylamine!	10.	11 1
1	67-72-1	-Hexachloroethane	l	10.	IU I
	98-95-3	-Nitrobenzene	1	10.	10
1	78-59-1	-Isophorone	1	10.	10 1
1	88-75-5	-2-Nitrophenol		10.	10 1
1		-2,4-Dimethylphen		10.	ih l
1	65-85-0	-Benzoic acid		50.	10   1
1	111-91-1	-bis(2-Chloroetho	xy)methanel	10.	ih l
1	120-83-2	-2,4-Dichlorophen	o II	10.	1p   1
1	120-82-1	-1,2,4-Trichlorob	enzenel	10.	14   1
1	91-20-3	-Naphthalene		10.	111 1
Ì	106-47-8	-4-Chloroaniline_		10.	111
1	87-68-3	-Hexachlorobutadi	ene	10.	141 1
- 1	59-50-7	-4-Chloro-3-methy	lphenolI	10.	I WI
-	91-57-6	-2-Methylnaphthal	ene!	10.	<b>≀</b> υβ ; Ι
1	77-47-4	-Hexachlorocyclop	entadiene	10.	<b>(ψ</b>
ļ	88-06-2	-2,4,6-Trichlorop	henoli	10.	14 1
- 1	95-95-4	-2,4,5-Trichlorop	henolI	50.	1
1	91-58-7	-2-Chloronaphthal	ene l	10.	101 1
1	88-74-4	-2-Nitroaniline	I	50.	10
F	131-11-3	-Dimethylphthalat	e1	10.	14 1
1	208-96-8	-Acenaphthylene	\	10.	14 // 1
1	606-20-2	-2,6-Dinitrotolue	ne	10.	111 1/1
ŀ	<del></del>	•			_1 <u>.!</u> 1
				·	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

1 BOOF94

EPA SAMPLE NO.

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: BOOFH5

Matrix: (soil/water) WATER

Sample wt/vol: 1000 (g/mL) mL

Lab Sample ID: 910408-029

Level: (low/med) LOW

Date Received: 04/05/91

Lab File ID: >11311

% Moisture: not dec.NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH:6.0

Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg)	ug/L	Q
1	7 Nitananalia		50.	
1 77-07-2	3-Nitroanılin	e	1D.	111 . 1
	Acenaphthene_ 2,4-Dinitroph		50.	
1 21-78-2	2,4-Dinitroph	eno Ii	50. 50.	
1 100-02-7	4-Nitrophenol		10.	
	Dibenzofuran_		10.	17.
1 04 44 0	2,4-Dinitroto	luene	10.	
1 34-66-2	Diethylphthal	ate	10.	
1 /009-/2-3	4-Chloropheny	1-buendietueri		
1 86-/3-/	Fluorene 4-Nitroanilin		10.	
1 100-01-6	4-Nitroanilin	e	50.	iù i
	4,6-Dinitro-2		5Ò.	!
1 86-30-6	N-Nitrosodıph	enylamine (1)!	10.	iù l
1 101-55-3	4-Bromophenyl	-phenyletherl	10.	1 W   1
1 118-74-1	Hexachloroben	zene	10.	I U
1 87-86-5	Pentachloroph	enoll	50.	114
1 85-01-8	Phenanthrene_	<del> </del>	10.	(1)
1 120-12-7	Anthracene		10.	ון טו
1 84-74-2	Di-n-butylpht	halate	10.	10   1
1 206-44-0	Fluoranthene_		10.	[Li
1 129-00-0			10.	10   1
	Butylbenzylph	thelate	1Ō.	U
1 91-94-1	3,3'-Dichloro	benzidine	20.	10 1
· 56-55-3	Benzo(a)anthr	acene	10.	ا \ نان ا
1 218-01-9	Chrysene		10.	16 1
1 117-91-7	bis(2-Ethylhe	vul inhthalate	10.	iù i
1 117-01-7	Distz-Ethylhs	talate	10.	์ เย็
1 71/-04-0	Benzo(b)fluor		10.	iu i
1 200-77-2	Benzakk)fluor	anthere	10.	iu
1 20/-00-7	benzetk)fluor	anthene	10.	נו
1 70-22-8	Benzo(a)pyren	1e		. –
1 エアクークソーワーーー	Indeno(1,2,3-	-calpyrenei	10.	10 -
1 53-70-3	Dibenzta,h)an	ithracene	10.	10 /
1 171-24-2	Benzolg.h,i)p	erylene	10.	i V
<u></u>	be separated from	11		1

1F SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

Contract:0288

B00F94

Lab Name: MARTIN MARIETTA

Lab Code: K25 Case No.: G132-001SAS No.: NA

SDG No .: NA BOOFHS

Matrix: (soil/water) WATER

Lab Sample ID: 910408-029

Sample wt/vol: 1000 (g/mL) mL

Lab File ID: >11311

Level: (low/med) LDW

Date Received: 04/05/91

% Moisture: not dec.NA dec. NA

Date Extracted: 04/11/91

Extraction: (Sepf/Cont/Sonc) SEPF

Date Analyzed: 4/15/91

GPC Cleanup: (Y/N) N pH:6.0

Dilution Factor: 1 2.00000

Number TICs found: |

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	1	I	1		10
CAS NUMBER	COMPOUND NAME	I RT	I EST CONC.	i Q	K
**********		=======		EREER	1,
123-42-2-	Diacetone Alcohol	7 6.17	8:0	1-3A	T
	CODM I CH TIC		1	787 Res	. ,

#### 1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BOOFH5

ab Name: Martin Marietta

Contract: 2/88

SAS No.: N/A

SDG No.: BOOFH5

atrix (soil/water): Water

Lab Sample ID: 910403-102

ample wt/vol: 1000

ab Code: K-25

(g/mL)

Case No.:

Lab File ID:

evel (low/med): low

Date Received: 03/31/91

Moisture: not dec.

dec.

ml

Date Extracted: 04/07/91

Date Analyzed: 05/06/91

PC Cleanup (Y/N): N

pH: 7

Dilution Factor: 1

CONCENTRATION UNITS: CAS NO. COMPOUND

(ug/L or ug/Kg): ug/L

Q

319-84-6alpha-BHC	0.050 U	
319-85-7beta-BHC	0.050 U	-
319-86-8delta-BHC	0.050 U	-
58-89-9gamma-BHC (Lindane)	0.050 Ú	-
76-44-8Heptachlor	0.050 U	-
309-00-2Aldrin	0.050 U	-[
1024-57-3Heptachlor epoxide	0.050 U	-
959-98-8Endosulfan I	0.050 U	-
60-57-1Dieldrin	0.10 U	-
72-55-94,4'-DDE	0.10 U	_
72-20-8Endrin	0.10 U	_
33213-65-9Endosulfan II	0.10 U	_[
72-54-84,4'-DDD	0.10 U	_[
1031-07-8Endosulfan sulfate	0.10 U	٦
50-29-34,4'-DDT	0.10 U	7
72-43-5Methoxychlor	0.50 U	-
53494-70-5Endrin ketone	0.10 ีบ	-
5103-71-9alpha-Chlordane	0.50 0	-
5103-74-2gamma-Chlordane	0.50 บ	-
8001-35-2Toxaphene	1.0 0	-
12674-11-2Aroclor-1016	0.50 U	-
11104-28-2Aroclor-1221	0.50 บ	-
11141-16-5Aroclor-1232	0.50 0	-
53469-21-9Aroclor-1242	0.50 U	_
12672-29-6Aroclor-1248	0.50	_
11097-69-1Aroclor-1254	1.0 0	~ [ ;

EPA SAMPLE NO.

Q

BOOF94

AD Name: Martin Marietta

Contract: 2/88

SDG No.: BOOFH5 SAS No.: N/A

itrix (soil/water): Water

Case No.:

Lab Sample ID: 910408-029

imple wt/vol: 1000

(g/mL) ml

Lab File ID:

vel (low/med): low

Date Received: 04/05/91

Moisture: not dec.

dec.

Date Extracted: 04/09/91

ctraction (SepF/Cont/Sonc): SepF

Date Analyzed: 05/06/91

C Cleanup (Y/N): N

1b Code: K-25

pH: 6

Dilution Factor:

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg): ug/L

319-84-6----alpha-BHC 0.050 U 319-85-7----beta-BHC 0.050 Ü 319-86-8-----delta-BHC 0.050 U 58-89-9-----gamma-BHC (Lindane) 0.050 U Ū 76-44-8-----Heptachlor 0.050 U 309-00-2-----Aldrin 0.050 1024-57-3-----Heptachlor epoxide 0.050 U 959-98-8-----Endosulfan I 0.050 U U 60-57-1-----Dieldrin 0.10 72-55-9-----4,4'-DDE 0.10 U U 72-20-8-----Endrin 0.10 33213-65-9----Endosulfan II U 0.10 72-54-8-----4,4'-DDD 0.10 U 1031-07-8----Endosulfan sulfate 0.10 U 50-29-3-----4,4'-DDT U 0.10 U 72-43-5-----Methoxychlor 0.50 ับ 53494-70-5----Endrin ketone 0.10 5103-71-9----alpha-Chlordane U 0.50 5103-74-2----gamma-Chlordane 0.50 U 8001-35-2----Toxaphene U 1.0 U 12674-11-2----Aroclor-1016 0.50 11104-28-2----Aroclor-1221 0.50 U _บ 11141-16-5-----Aroclor-1232 0.50 53469-21-9-----Aroclor-1242 _ับ 0.50 U 12672-29-6----Aroclor-1248 0.50 11097-69-1-----Aroclor-1254 U 1.0 11096-82-5----Aroclor-1260 1.0 U

SAMPLE NO.

BOOFH5

INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910403-102

Level (low/med): LOW

Date Received: 03/31/91

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	c	Q	м	
7429-90-5	Aluminum	33.2	B		P	K
7440-36-0	Antimony	50.0	Ū		P	
7440-39-3	Barium	29.0	B		P	1
7440-41-7	Beryllium	0.30	Ū		P	
	Bismuth	50.0	<del>V</del>	<i>N</i>	P	
7440-43-9	Cadmium	3.0	Ū			
7440-70-2	Calcium	37100~	1		P	ŀ
7440-47-3	Chromium	10.0	Ū		P	1
7440-48-4	Cobalt	5.0	Ū		P	ļ
7440-50-8	Copper	4.0	<b>֓</b> ֞֞֞֞֡֓֡֓֓֡֓֞		P	1
7439-89-6	Iron	138 ~	\ <u> </u>		P	1
7439-95-4	Magnesium	11300 i			P	ļ
7439-96-5	Manganese	6.6	豆		P	1
7440-02-0	Nickel	10.0	垭		P	l
7440-09-7	Potassium	4930 ~	₿	ł	P	
7440-22-4	Silver	6.0 °	Ū		P	
7440-23-5	Sodium	16000 ~		E	P	17
	Strontium	185			P	
	Tin	37.8	<u> </u>		P	K
7440-62-2	Vanadium	15.6	B		P	1
7440-66-6	Zinc	7.3 V			P	

olor Before: COLORLESS

Clarity Before: CLEAR

Texture:

lor After: COLORLESS

Clarity After: CLEAR

Artifacts:

mments:

K-25 Analytical Chemistry Department ANALIS ID #: 910403-102

#### 1 INORGANIC ANALYSES DATA SHEET

•	1 INORGANIC ANALYS	SES DATA SHEET	EPA SAMPLE NO.
ab Name: MARTIN MARIETT	A K25 SITE Co	tract: HANFORD	BOOFH5

ab	Code:	K25ACD	Case No.:	SAS No.:	<b>S</b> :

SDG No.: BOOFH5

atrix (soil/water): WATER

Lab Sample ID: 910403-102

evel (low/med): LOW

Date Received: 03/31/91

Solids:

__0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	С	Q	м
7429-90-5	Aluminum		-		$\overline{NR}$
7440-36-0	Antimony_		_ا		NR
7440-38-2	Arsenic	5.5	B		F
7440-39-3	Barium		}		NR
7440-41-7	Beryllium		-		NR
7440-43-9	Cadmium		-		NR
7440-70-2	Calcium	<del></del>	-		NR
7440-47-3	Chromium		<b> </b>		NR
7440-47-3	Cobalt Cobalt		-		NR
7440-50-8		<u> </u>			NR
7439-89-6	Copper		-		NR
7439-09-0	Lead	9.6	~	[ <del></del>	F
7439-95-4	Magnesium		-		NR
7439-96-5	Manganese		<b> </b> -		NR
7439-97-6	Mercury	0.17	1		CV
7440-02-0	Nickel		"		NR
7440-02-0	Potassium		-	<del></del>	NR
7782-49-2	Selenium	2.0	7	<b>1</b>	F
7440-22-4	Silver		] '	<del></del>	NR
7440-22-4	Sodium Sodium		<b> </b> –		NR
	Thallium	6.0	<b>/</b>	- w	F
7440-28-0		o.u	٦	m	NR
7440-62-2	Vanadium_	<del>-</del>	-	l———	
7440-66-6	Zinc		-		NR
	Cyanide		<b> </b>		NR
	.	!	<b>I</b> _	<u> </u>	l

11/8/15	/an
8//5	Pac

	•			
٦	1	$\sim$	Before:	
		~_	DELOTE	

COLORLESS Clarity Before: CLEAR_ Texture:

olor After: COLORLESS Clarity After: CLEAR Artifacts: ____

omments	:	
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 		<del></del>

## U.S. EPA - CLP

	I	NORGANIC A	l Nalysis data si	HEET	EPA SAMPLE NO.
Lab Name: $\gamma \gamma$	Partin Max	-ietta	Contract:		BOOFHS
Lab Code:	Cas	se No.:	SAS No.:		SDG No.: BOOFH 5
Matrix (soil/	vater): vate	<u>~</u>	•	Lab Samp	le ID: <u>9/09/03-102</u>
Level (low/med				Date Reco	eived: 3-31-91
% Solids:	1/6	<u> </u>			
Co	ncentration	Units (ug/	3/8/92 L or mg/kg dry	weight):	male.
	CAS No.	Analyte	Concentration	C Q	M
	7429-90-5	Aluminum			<b>!—!</b>
	7440-36-0	Antimony	!	-	·
	7440-38-2	Arsenic			i—i
	7440-39-3	Barium			i <u> </u>
	7440-41-7	Beryllium			i_i
	7440-43-9				i <del>-</del> i
	7440-70-2	Calcium_			i_i
	7440-47-3			_	<u>                                     </u>
	• ·	Cobalt	i	_	
	17440-50-8	Copper	!	!!	<u>  </u>
	17439-89-6	Iron	ļ		<u> </u>
	[7439-92-1	•	ļ		<b> </b>
,	7439-95-4  7439-96-5	Magnesium			
·	7439-97-6		<u> </u>	!!- <del></del>	<b>├─</b> ├
	7440-02-0		<u> </u>	¦−¦	
	7440-09-7	·	İ	╏ <b>一</b> ╏───	- Miller
	7782-49-2	•		:-:	= AM 8/15/41
	7440-22-4	•		-	
	7440-23-5			i-i	i <b>T</b> i
	7440-28-0	Thallium			
	7440-62-2	Vanadium_			
	17440-66-6	Zinc			
		Cyanide_	160.1	<u> - </u>	. _  <
				1_1	.
Color Before:		Clari	ty Before:	····	Texture:
Color After:		Clari	ty After:		Artifacts:
Comments:			•		

SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

BOOFH6

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910403-103

Level (low/med): LOW

Date Received: 03/31/91

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

						1
CAS No.	Analyte	Concentration	С	Q	М	
7429-90-5	Aluminum	24.9	B		P	u
7440-36-0	Antimony	50.0	ן ט		P	
7440-39-3	Barium	28.9	В		P	İ
7440-41-7	Beryllium	0.30	वाकावा <mark>क</mark>		P	_
	Bismuth	50.0	Ū	N-	P	K
7440-43-9	Cadmium	3.0	<u>a</u>		P	Ì
7440-70-2	Calcium	37100			P	
7440-47-3	Chromium	10.0	<u>u</u>		P	
7440-48-4	Cobalt	5.0	Ū		P	ļ
7440-50-8	Copper	4.0	ו טו		P	i
7439-89-6	Iron	28.7	8		P	u
7439-95-4	Magnesium	11400	-		P	
7439-96-5	Manganese	3.8	В		P	]
7440-02-0	Nickel	10.0	ַ		<u>P</u>	
7440-09-7	Potassium	<u>4*880</u>	ងប្រាង្ឋ	<del></del>	<u>P</u>	İ
7440-22-4	Silver	6.0	U	ļ <u></u>	<u>P</u>	
7440-23-5	Sodium	16000		<u>E</u>	<u>P</u>	<u> </u>
	Strontium	186			<u>P</u>	جر ا
	Tin	30.0	U	*	P	1
7440-62-2	Vanadium	13.9	(काकाक्षा (काकाक्ष			]
7440-66-6	Zinc	1.3	<u>B</u>		<u>P</u>	]

olor Before: COLORLESS

Clarity Before: CLEAR

Texture:

olor After: COLORLESS

Clarity After: CLEAR

Artifacts:

mments:

K-25 Analytical Chemistry Department ANALIS ID #: 910403-103

#### 1 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

	•	INORGANIC P	MUNITONO DATA .	سنتن		
b Name: MART	IN_MARIETTA	K25_SITE_	Contract: H	ANF	ORD	BOOFH6
b Code: K25A	CD Ca	se No.:	SAS No.	: _		SDG No.: BOOFH5
trix (soil/w	ater): WATE	R.		La	b Sampl	e ID: 910403-103
vel (low/med	): LOW	_		Da	te Rece	ived: 03/31/91
Solids:	0.	0				F
Co	ncentration	Units (ug,	L or mg/kg dr	y w	eight):	UG/L_
	CAS No.	Analyte	Concentration	c	Q	м
	7429-90-5 7440-36-0 7440-38-2 7440-39-3 7440-41-7 7440-43-9 7440-47-3 7440-48-4 7440-50-8 7439-95-4 7439-95-4 7439-95-5 7439-97-6 7440-02-0 7440-02-0 7440-23-5 7440-23-5 7440-28-0 7440-62-2 7440-66-6	Aluminum_Antimony_Arsenic_Barium_Beryllium_Cadmium_Calcium_Chromium_Cobalt_Copper_Iron_Lead_Magnesium_ManganeseMercury_Nickel_Potassium_Selenium_Silver_Sodium_Thallium_Vanadium_Zinc_Cyanide_				NR NR NR NR NR NR NR NR NR NR NR NR NR N
lor Before:	COLORLESS		y Before: CLE	AR_	-	Texture:
lor After:	COLORLESS	Clarit	ty After: CLE	AR_	-	Artifacts:
mments:						

#### ENVIROFORMS/CLP 788

SAMPLE NO.

BOOF94

1. INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910408-029

Level (low/med):

LOW

Date Received: 04/05/91

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

·	<del>~</del>		$\overline{}$			
CAS No.	Analyte	Concentration	С	Q	M	
7429-90-5	Aluminum	60.2	Ē		P	u
7440-36-0	Antimony_	50.0	<u>u</u>		P	
7440-39-3	Barium	21.9	<u>B</u>		P	1
7440-41-7	Beryllium	0.30	Ū		P	1
	Bismuth	50.0	Ū	N	P	R
7440-43-9	Cadmium	3.0	U		P	[```
7440-70-2	Calcium	35100	-		P	
7440-47-3	Chromium	22.3	_		P	i
7440-48-4	Cobalt	5.0	<u>U</u>		P	ļ
7440-50-8	Copper	4.0	ซิ		P	l
7439-89-6	Iron	111			P	
7439-95-4	Magnesium	10400	-		P	1
7439-96-5	Manganese	2.6	B		P	1
7440-02-0	Nickel	10.0	<u>B</u>		P	ĺ
7440-09-7	Potassium	5720			P	}
7440-22-4	Silver	6.0	Ū		P	l
7440-23-5	Sodium	24200	=	E	P	フ
	Strontium	214		1	P	] _
	Tin	30.0	ĮĮ.	*	P	K
7440-62-2	Vanadium	21.0	В			ŀ
7440-66-6	Zinc	1.0	<u>B</u>		P	<u> </u>
		,	, —		- —	•

olor Before: COLORLESS Clarity Before: CLEAR

Texture:

olor After: COLORLESS

Clarity After: CLEAR

Artifacts:

mments:

K-25 Analytical Chemistry Department ANALIS ID #: 910408-029

#### 1 INORGANIC ANALYSES DATA SHEET

EPA	SAMPLE	NO	•

N_MARIETTA	K25 SITE	Contract: HANFORD		BOOF94				
	<del></del>				SDG No.: BOOFH5			
atrix (soil/water): WATER				Lab Sample ID: 910408-029				
evel (low/med): LOW			Date Received: 04/05/91					
0.0	ס							
centration.	Units (ug	L or mg/kg dry	y wei	ight):	UG/L_			
CAS No.	Analyte	Concentration	С	Q I	м			
7429-90-5	Aluminum		<u> </u>		NR			
			1=1=		NR			
		9.2	B		F_			
			_ _		NR			
			- -		NR			
			- -		NR   NR			
			- -		NR NR			
			<b>\-</b> \-		NR			
			-  <del>-</del>		NR			
		·	\-\ <i>-</i> -		NR			
7439-92-1	Lead	·	<del>ט</del>		F_			
			<u> - -</u>		NR			
			_ -		NR ·			
		0.18	-		CV			
			- -		NR NR			
					F ut			
7440-22-4					NR			
			- -		NR			
		6.0	<del> </del>		F_{			
7440-62-2	Vanadium_		1_1_		NR			
7440-66-6	Zinc		_ _		NR ///			
	Cyanide			<u> </u>	NR / 8/15/97			
COLORLESS	Clari	ty Before: CLE	AR_		Texture:			
COLORLESS	Clari	ty After: CLE	AR_		Artifacts:			
	ED Cas ter): WATER : LOW	Case No.:  ter): WATER  : LOW	Case No.: SAS No.  Ster): WATER  : LOW	The color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the color of the c	Case No.: SAS No.:			

## U.S. EPA - CLP

	EPA SAMPLE NO.				
Lab Name: $\underline{\mathcal{M}}$	artin Mar	ietta	Contract:		Boo F 94
Lab Code:	Case No.:		SAS No.:	SDG No.: H5	
Matrix (soil/wa	ater): wate	<u>r</u>		Lab Sample	e ID: 9/0408-029
Level (low/med	):	<u></u>		Date Rece	ived: 8-Apr-1491
% Solids:	<u>/</u> \/	<u>A</u>	0 / 1		
Cor	centration	Units (ug/	}	weight):	mgle .
	CAS No.	Analyte	Concentration	c Q	м
	7440-38-2   7440-39-3   7440-41-7   7440-43-9   7440-70-2   7440-47-3   7440-48-4   7440-50-8   7439-95-4   7439-95-4   7439-95-4   7439-97-6   7440-02-0   7440-02-0   7440-23-5   7440-28-0	Antimony			
Color Before:		Clari	ty Before:		Texture:
Color After:		Clari	ty After:	<u> </u>	Artifacts:
Comments:					

INORGANIC ANALYSIS DATA SHEET

Lab Name: MARTIN MARIETTA

Contract:

BOOF95

Lab Code: K25 Case No.: SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Lab Sample ID: 910408-030

Level (low/med): LOW

Date Received: 04/05/91

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

<del></del>						•
CAS No.	Analyte	Concentration	С	Q	м	
7429-90-5	Aluminum	20.7	B		P	U
7440-36-0	Antimony	50.0	ับ		P	
7440-39-3	Barium	21.9	B		P	
7440-41-7	Beryllium	0.30	$\overline{v}$		P	_
	Bismuth	50.0	₽.	N	P	$ \mathcal{R} $
7440-43-9	Cadmium	3.0	ादाक्षाताबाद 			<b> </b> ' '
7440-70-2	Calcium	35600	-	<del></del>	P	
7440-47-3	Chromium	12.6	-		P	
7440-48-4	Cobalt	5.0	<u></u>		P	
7440-50-8	Copper	4.0	ष्विदादा		P	
7439-89-6	Iron	28.8	Ē	<del></del>	<del>-</del>	11
7439-95-4	Magnesium	10400	<b>-</b>		=	ا ا
7439-96-5	Manganese	1.1	B		P	
7440-02-0	Nickel	10.0	<u>B</u>		P	
7440-09-7	Potassium	*6190			P	
7440-22-4	Silver	6.0	Ū		P	
7440-23-5	Sodium	27200	-	E	P	フ
	Strontium	217			P	ـــا [
	Tin	30.0	<del>U</del> -	*	P	K
7440-62-2	Vanadium	19.7	DIMIC DIMIC		P	1
7440-66-6	Zinc	1.0	<u>ַ</u> עַ		P	l ,
						1/MM 1/5/46

Color Before: COLORLESS Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

K-25 Analytical Chemistry Department ANALIS ID #: 910408-030

EPA SAMPLE NO.

	1		
INORGANIC	ANALYSES	DATA	SHEET

	•	THOROTHAL P	Hamibio Dilli			1	
Lab Name: MARTI	IN_MARIETTA	_K25_SITE_	Contract: H	MI	FORD	ВС	OOF95
Lab Code: K25A0	CD Ca	se No.:	SAS No.:	: _	<del></del>	SDG No	.: BOOFH5
Matrix (soil/wa	ater): WATE	R		Lā	ab Sampl	e ID: 9	10408-030
Level (low/med)	: LOW_	_		Da	ate Rece	ived: 0	4/05/91
% Solids:	0.	0					·
Con	ncentration	Units (ug,	L or mg/kg dry	, v	veight):	UG/L_	·
ļ							
	CAS No.	Analyte	Concentration	C	Q	<b>M</b> .	
	7429-90-5	Aluminum				NR	
	7440-36-0	Antimony		_		NR	
	7440-38-2	Arsenic	8.7	B		F	
	7440-39-3	Barium				NR	
,	7440-41-7	Beryllium				NR	
<u>.</u>	7440-43-9	Cadmium_		_		NR	
	7440-70-2	Calcium_		_		NR	
Ì	7440-47-3	Chromium_		_		NR	
		Cobalt		_		NR	
		Copper				NR NR	
	7439-89-6 7439-92-1	Iron	2.0	ŦŤ		F	
		Magnesium				NR	•
		Manganese		_		NR	
	7439-97-6	Mercury	0.17	ប៊		cv	
	7440-02-0	Nickel		_		NR	
	7440-09-7	Potassium		_		NR	
	7782-49-2	Selenium_	2.0	U		F_	/
		Silver				NR	of M.
		Sodium		=		NR	IIII Jan
	7440-28-0	Thallium_	6.0	<u></u>		F_NR	14 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/
	7440-62-2 7440-66-6	Vanadium_ Zinc	<del></del>	-		NR A	P1/51°
	7440-00-0	Cyanide		-		NR NR	· t ·
	<del></del>	cyamine		-		111	
		· ———	· ———— ·			—— I	

olor	Before:	COLORLESS	Clarity	Before:	CLEAR_	Texture:	
olor	After:	COLORLESS	Clarity	After:	CLEAR_	Artifacts:	<del></del> _
ommer	nts:						

### 4-1-1 INORGANIC ANALYSES DATA SHEET WET CHEMISTRY

Oak Ridge K-25 Site Lab Name: Analytical Chemistry I	Westinghouse Department Contract: Hanford Company
Matrix (soil/water):WATER	SDG#: _BOOFH5
ACD Sample ID Number:910403-102	Customer Sample ID: BOOFH5
	Date Received: 10-May-1991

Analyte	Concentration	Units	Batch No.	Date of Analysis
7.7.1		76-73	01 12	0.3-20.01
Alkalinity	105	_Mg/l	91-13	8-Apr-91
Ammonia	<0.20	_Mg/l	91-09	10-Apr-91
Bromide	N/A			ll
Chemical O2 Demand	<u>&lt;5</u>	Mg/1_	91-18	8-Apr-91
Chloride IC	7	_Mg/l	91-42IA	19-Apr-91
Conductivity	357	umho/cm		5-Apr-91
Dissolved Solids	242	Mg/1	91-23	8-Apr-91
Fluoride SIE	0.4	_Mg/l	91-30	3-May-91
Nitrate	35	_Mg/l	91-42IA	19-Apr-91
Nitrate Nitrogen	N/A			<u> </u>
_Nitrite	<1	Mg/1	91-42IA	19-Apr-91
Nitrite Nitrogen	N/A			
Ortho Phosphate	N/A			
Sulfate	37	Mg/l	91- 42IA_	_19-Apr-91
Total Organic Carbon	<1	Mg/l_	91-260	13-Apr-91
Total Organic Halides	15 -	_Mg/l	91-211	6-May-91
Turbidity	0.60	NTU	91-22	8-Apr-91
pH	8.1	I	91-39	8-Apr-91

11s/42

:OMI	ments:		ŕ						
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		 		<del> </del>	 	 	 	 	
		 	<del></del>		 	 	 	 	

### 4-1-2 INORGANIC ANALYSES DATA SHEET WET CHEMISTRY

Oak Ridge K-25 Site Lab Name: Analytical Chemistry Depar	Westinghouse rtment Contract: Hanford Company
Matrix (soil/water):Water	SDG#:BOOFH5
ACD Sample ID Number:910408-029	Customer Sample ID:BOOF94
	Date Received:5-April-1991_

Analyte	Concentration	Units	Batch No.	Date of Analysis
Alkalinity	99	Mg/l	91-14	9-Apr-91
Ammonia	<0.2	Mg/l	91-9	10-Apr-91
Bromide	N/A			
Chemical O2 Demand	<5	_Mg/l	91-19	10-Apr-91
Chloride IC	5	_Mg/1	91-45IA_	19-Apr-91
Conductivity	430 5	umho/cm	91-14	9-Apr-91
Dissolved Solids	298	Mg/l	91-23	10-Apr-91
Fluoride SIE	0.9	Mg/g L	91-35	22-May-91
Nitrate	66 ===	Mg/g L	_91-45IA_	10-Apr-91
Nitrate Nitrogen	N/A	]		
Nitrite	<1<1	Mg/g_ <u>L</u>	_91-45IA_	19-Apr-91
Nitrite Nitrogen	N/A			
Ortho Phosphate	N/A			
Sulfate	31	_Mg/g/	91-45IA_	19-Apr-91
Total Organic Carbon	<1	_mg/1	_91-260	13-Apr-91
Total Organic Halides_	<10 <u>u</u>	_ug/=1	_91-21I	21-May-91
Turbidity	0.53 <u>T</u>	NTU	91-22_	9-Apr-91
pH	8.1		91-40	9-Apr-91
		!	1	[

Mr 8/15/42

Comm	ents:					-	
					<u>, , , , , , , , , , , , , , , , , , , </u>		
		,, <u>,</u> ,,		 	 		
		 	<del>,</del>	 	 		

# ATTACHMENT 4 DATA VALIDATION SUPPORTING DOCUMENTATION

### VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-1

PROJECT: 200 BP/	REVIEWER: [M.A	DATE:
LABORATORY: Z-25	CASE: POOFHS	SDG: QUIFHS
SAMPLES/MATRIX: BONFHS	FALOF94	<u></u>
	<del>, , , , , , , , , , , , , , , , , , , </del>	

### 1. DATA PACKAGE COMPLETENESS

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative Data Summary Chain-of-Custody		1	7	
QC Summary Surrogate report MS/MSD report Blank summary report GC/MS tuning report Internal standard summary report				
Sample Data Sample reports TIC reports for each sample RIC reports for all samples Raw and corrected spectra for all detected results Raw and corrected library search data for all reported Quantitation and calculation data for all TIC	I TIC	1		
Standards Data Initial calibration report RIC and quantitation reports for initial calibration Continuing calibration reports RIC and quantitation reports for cont. calibrations Internal standard summary report		1/1/1/1		
Raw QC Data Tuning report, spectra and mass lists Blank analysis reports TIC reports for all blanks RIC and quantitation reports for blanks Raw and corrected spectra for all detected results in the		111/4/4		

Data Package Item	Present?:	Yes	No	N/A
Quantitation and calculation data for all TIC MS/MSD report forms RIC and quantitation reports for MS/MSD	-		<u></u>	
Additional Data  Moisture/% solids data sheets Reduction formulae Instrument time logs Chemist notebook pages Sample preparation sheets				
2. HOLDING TIMES				
Complete the holding time summary form listing all sample	es and dates of co	llection :	and analy	ysis.
Were all samples analyzed within holding time?	4 9/14/82	(Yes)	No	N/A
ACTION: If any holding times were exceeded, but not by associated samples as estimated (J for detects or UJ for no (R) and qualify all associated detects as estimated (J).	greater than a fac	etor of the	vo, qual all nond	ify etects
3. INSTRUMENT CALIBRATION, TUNING AND PER	RFORMANCE CH	ECKS		
3.1 GC/MS TUNING AND PERFORMANCE CHECKS				
Is a bromofluorobenzene tune report present for each appl	icable 12-h period	Yes	No	N/A
Do all tunes on all instruments meet the tuning criteria?	-	Yes	No	N/A
Do all tunes on all instruments meet the expanded criteria	?	Yes	No (	N/A
Has the laboratory made any calculation or transciption er	rors?	Yes (	No	N/A
Have the proper significant figures been reported?		Yes	) No	N/A
ACTION: If the mass calibration is out of specification be associated data as estimated (J for detects or UJ for nondequalify all associated data as unusable (R).	•			•
3.2 INITIAL CALIBRATION				
Is an initial calibration report provided for all instruments?	(	Yes	No No	N/A
Are all RSD values ≤30% (2/88 SOW)?		Yes (	No	N/A
Are all RRF values ≥0.05 (2/88 SOW)?	(	Yes	No	N/A

Are all applicable RSD values ≤20.5% (3/90 SOW)?	Yes	No N/A
Are all applicable RSD values ≤40% (3/90 SOW)?	Yes	No N/A
Are all applicable RRF values within SOW limits (3/90 SOW)?	Yes	No N/A
Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?	Yes	No N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to two TCL compounds, if any RRF value is out of specification qualify all detected results for the particular compound as estimated (J) and all nondetects as unusable (R). Making allowances for up to two TCL compounds, if any RSD value is out of specification qualify all associated data as estimated (J for detects or UJ for nondetects).

### 3.3. CONTINUING CALIBRATION

Is a continuing calibration report present for all 12-h periods in which associated samples were analyzed?	Yes	No	N/A
Are all RRF values ≥0.05 (2/88 SOW)?	Yes	) No	N/A
Are all %D values ≤25% (2/88 or 3/90 SOW)?	Yes	No	N/A
Are all %D values ≤40% (3/90 SOW)?	Yes	No	N/A
Are all RRF values within SOW limits (3/90 SOW)?	Yes	No	N/A
Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?	Yes	No	N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to two TCL compounds, if any RRF value is out of specification qualify all associated detected results as estimated and all nondetects as unusable (R). Making allowances for up to two TCL compounds, if any %D is out of specification, qualify all associated results as estimated (J for detects or UJ for nondetects).

### 4. BLANKS

### 4.1 LABORATORY BLANKS

Has the laboratory conducted a method blank analysis per matrix for every 12-h period in which samples were analyzed?

Yes No

Yes No

N/A

N/A

Chinesh, 7-Hex, Acet, 2-Ketauree, 1122.76A

ACTION: Qualify all sample results <10 time the highest blank concentration for the common laboratory contaminants, as nondetects (U) or at the SQL if the result is <CRQL. Qualify all remaining sample results <5 times the blank concentration in similar fashion.

### 4.2. FIELD BLANKS

Are TCL compounds present in the field blanks?

Yes No

N/A

ACTION: Qualify all detected sample results <5 times the amount in any valid field blank as nondetects (U) and note the field blank results in the validation narrative.

#### ACCURACY

### 5.1 SURROGATE/SYSTEM MONITORING COMPOUND RECOVERY

Are any surrogate recoveries out of specification?

Yes No N/A

Are any surrogate recoveries < 10%?

Yes No N/A

Are any method blank surrogate recoveries out of specification?

es No N/A

ACTION: Qualify all associated sample results as estimated (J for detects or UJ for nondetects) for surrogates out of specification but > 10%. Qualify all associated positive sample results as estimated (J) and all nondetect results as unusable (R) for all surrogates below 10%. If method blank surrogates are out of specification and the associated sample surrogates are acceptable no qualification is necessary, however, the laboratory should be contacted for an explanation.

#### 5.2 MATRIX SPIKE RECOVERY

Has an MS/MSD analysis been conducted per matrix in the sample group?

Yes No

Are MS/MSD recoveries within specification?

es <u>No</u> N/A

N/A

Are there any calculation errors?

Yes (No ) N/A

ACTION: If an MS/MSD analysis has not been conducted contact the laboratory for an explanation. Review the MS/MSD recoveries in conjunction with other QC data such as surrogate recoveries and note the results in the validation narrative. If MS/MSD recoveries are out of specification and sample concentration is >5 times the spike concentration, no qualification is required, otherwise qualify results as follows: Qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J) in all samples if associated surrogates are also out of specification. The qualification shall only be done on samples of similar matrix as the MS/MSD samples. If it is determined from the review that only the spiked samples are affected by low recoveries, qualify only the results for the spiked sample as described above. If it is determined from the review that out of specification MS/MSD recoveries are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

### 5.3 PERFORMANCE AUDIT SAMPLES

Are the performance audit sample results within the acceptance limits?

Yes No



ACTION: Note the results of the performance audit sample in the validation narrative.

### 6. PRECISION

### 6.1 MATRIX SPIKE/MATRIX SPIKE DUPLICATES

Are RPD values within specification?

Yes

No

N/A

Are there any calculation errors?

es No

)__ N/A

ACTION: Review the MS/MSD results in conjunction with other QC data such as field duplicates and note the results in the validation narrative. If MS/MSD RPDs are out of specification and sample results are >5xCRQL qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

### 6.2 FIELD DUPLICATE SAMPLES

Are field duplicate RPD values acceptable?

Yes No



ACTION: Note the results of the field duplicate samples in the validation narrative.

### 6.3 FIELD SPLIT SAMPLES

Are field split RPD values acceptable?

Yes

No



ACTION: Note the results of the field split samples in the validation narrative.

### 7. SYSTEM PERFORMANCE

### 7.1 INTERNAL STANDARDS PERFORMANCE

Are any internal standard area counts outside the acceptance limits?

Yes No

N/A

Are retention times for any internal standard outside the ±30 second windows established by the most recent calibration check?

Yes (No)

ACTION: If the area counts are outside the acceptance limits qualify all associated results as estimated (I for detects or UI for nondetects). If it is determined from the review that out of specification area counts and relative retention times are indicative of systematic problems within the laboratory the reviewer may consider rejection of all affected sample data (R).

### 8. COMPOUND IDENTIFICATION AND QUANTITATION

### 8.1 COMPOUND IDENTIFICATION

Are detected compounds within  $\pm 0.06$  relative retention time units of the associated calibration standard? N/A Yes Are all ions at a relative intensity of ≥10% in the standard spectra present in the sample spectra? N/A Do the relative intensities between the standard and sample spectra agree within 20%? N/A Have all ions > 10% in the sample spectra that are not present in the standard spectra been reviewed for possible background contamination? N/A No Are molecular ions present in the reference specrum present in the sample spectrum? No Yes ACTION: If compound identification is in error and retention time and mass spectral criteria are

ACTION: If compound identification is in error and retention time and mass spectral criteria are exceeded qualify all affected positive results as unusable (R). If cross-contamination between analyses is suspected, qualify affected data as unusable (R). Note the results in the validation narrative.

### 8.2 REPORTED RESULTS AND QUANTITATION LIMITS

Has the laboratory used the correct RRF values and internal standard(s) for quantitation?

Are results and quantitation limits calculated properly?

Has the laboratory reported the sample quantitation limits within 5xCRQL values?

Yes No N/A

ACTION: If the results and quantitation limits are in error contact the laboratory for clarification and note in the validation narrative.

### 8.3 TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

Has the laboratory conducted a spectral library search on all candidate TIC peaks in accordance with the analytical SOW?

Yes No N/A

Has the laboratory properly identified and coded all TIC?

Yes No N/A

ACTION: If the laboratory has failed to search the minimum number of TIC peaks in the chromatogram contact the laboratory for submittal of the required data. Qualify as nondetects (U) all TIC compounds present in samples and blanks using the review criteria specified in the validation requirements. If TIC identification is in error sample results should be qualified as nondetects (U) or unusable (R). If TIC identifications are judged valid, qualify the results as presumptive and estimated (JN).

### 9. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Yes No N/A

Were project specific data quality objectives met for this analysis?

Yes No N/A

ACTION: Summarize all the data qualifications recommended in the foregoing sections, and complete the data validation narrative according to the requirements of Section 10.0 of the data validation requirements.

SDG: ROTHS	REVIEWER:	K-My	<u>.</u>	DATE: 9/	1/92		PAGE <u>/</u> OF <u>/</u>
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BOOFFEL	WA.	3/27/31		4/5/41		9	J/45
BOOK 94	11	4/3/9/		4/10/9/		7	now
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### **3**A WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No.: G132-001SAS No.: NA SDG No.: BDDFH5

Matrix Spike - EPA Sample No.: BOOFH5

I COMPOUND	SPIKE	SAMPLE	I MS I	MS   QC
	ADDED	CONCENTRATION	ICONCENTRATION I	%  LIMITS
	(ug/L)	(ug/L)	I (ug/L) I	REC #  REC.
1,1-Dichloroethene    Trichloroethene    Benzene    Toluene    Chlorobenzene	50.00 50.00 50.00 50.00 50.00	0.00 0.00 0.00	1 31.001 1 40.004 1 36.004	72 +176-125

COMPOUND	SPIKE ADDED (ug/L)	l MSD i ICONCENTRATIONI I (ug/L) l	MSD % REC		1 %   RPD #1	QC LIMITS RPD   REC.
1 ,1-Dichloroethene	50.00 50.00 50.00 50.00 50.00	1 28.001 1 38.001 1 33.001	55V 76V 66V	*	100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 100 1 1	14  61-145 14  71-120 11  76-127 13  76-125 13  75-130

# Column to be used to flag recovery and RPD values with an asterisk * Values outside of  $\sim$  1:000

*	Ua l	lues	outs	ide	σf	пο	lim	it	-

5 outside limits

Spike Recovery: 5 out of 10 outside limits

COMMENTS:			
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# VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: MARTIN MARIETTA Contract: 0288

Lab Code: K25 Case NoG132-0014 AS No.: NA SDG NoBOOFH5

Instrument ID: 70 2 Calibration Date(s):3/25/91 3/25/91

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC( $\frac{1}{4}$ ) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

— · · · · · · · · · · · · · · · · · · ·	=>0853: 0=>0853:			50 =>085 200=>085		<u> </u>	 
	RRF20	IRRF50		RRF150	RRF200	•	% RSD
		•					
Chloromethane:	§ .919					1.467	
Bromomethane	* 1.1704	1 1.4//	1 1.469				
Chloroethane Methylene_Chloride			1.626				
Acetone Carbon_Disulfide			2.660			2.760	
Larbon_Ulsulfide	1 2.70U	1 2.7/2	1 1.491				
1,1-Dichloroethene	\$ 2.963	1 2.878					
1,2-Dichloroethene_(total)_			1.532				
	* 3.448						
1,2-Dichloroethane							3_8
2-Butanone						1 .079	10.0
1,1,1-Trichloroethane						.631	2.2
Carbon_Tetrachloride						1 .574	1 2.0
Vinyl_Acetate						1 .120	14.3
Bromodichloromethane					. <i>7</i> 84	.770	
1,2-Dichloropropane	* .406	1 .412	1 .464	.413	1 .462	.431	
cis-1,3-Dichloropropene	1 .587	1 .585	1 .631	1.592	.592	1.597	
Trichloroethene		1 .459	1 .461	1 .419	.433	1 .456	
Dibromochloromethane	1 .615	1 .607	1 .658	1 .613	1 .625		
1,1,2-Trichloroethane		1 .338	1 .372	1 .349	1 .359		•
Benzene		1 .924	1 1.016	1 .960			
trans-1,3-Dichloropropene		1 .462	1.499	.470			
Bromoform	# .482	1 .381	1 .419	1 .385			
4-Methyl-2-pentanone	1 .272	1 .236					
2-Hexanone	1 .142	1 .087					
Tetrachloroethene	1 .465						
1,1,2,2-Tetrachloroethane							
To luene	* .790						
Chlorobenzene	# 1.023						
C (191Bell2elle	<b>* .476</b>				453		
Styrene	.788					—	
Xylene_(total)	.1 .470	1 .474	1 .459	1 .463	1 .470	1 .467	1.3
To luene-d8	1.204	1 1 100	1 1.116	1 1.203	1.165	1.162	
Bromofluorobenzene	1 .689						
1,2-Dichloroethane-d4	1.457						
	. 1.49/ 	'  1.325 	1 1.200	1 1.477	1	1	1
	FOR	M UI UE	A.	· · <del></del>		1/	87 Re

Lab Name: MARTINMARIETTA		Cont	ract: _	<del> </del>	·	* ;=	
Lab Code: Case Ro.	.: <u>6132-</u> 0	2016 SAS	No.:	<del></del>	SDG No	.: 300F	TH5
Instrument ID: 5100	Cal	ibratio	n Date(s	e): <u>03/</u>	08/91	03/08/	/91
Matrix:(soil/water) <u>WATER</u> ]	Level:(le	ow/med)	LOW	Column	:(pack/c	ap) <u>CA</u> F	<u> </u>
Ain $\overline{RRF}$ for $SPCC(#) = 0.300$	(0.250	for Bro	moform)	Max %R	ED for C	CC(*) =	30.0
LÁB FILE ID: RRF2: RRF100= IC30308 RRF15	0 = <u>IC10</u> 50= <u>IC40</u>	308 308	RRF	200= <u>IC</u>	50308		
COMPOUND	RRF20	: :RRF50	RRF100	RRF150	RRF200	RRF	% RSD
	-;=====	<b> =====</b>	=====	=====	=====	======	=====
,Unicromethane	_≠ 3.07E	; 3.177	3.012	2.926	; 3.010;	3.040	3.17
Bromomethane	2.007	1.899	1.894	1.750	! 1.730!	1.856	6.2
Vinyl Chloride	_* 2.309	! 2.308	2.237	2.192	: 2.220!	2.253	2.4
Chloroethane Metnylene Chloride	1.099	1.098	1.075	0.996	: 0.983;	1.050	5.4
Metnylene Chloride	_, S.118	1 2.075	2.142	2.032	: 1.997;	2.072	2.8
Acetone Carbon Disulfide	_, 4.828	1.245	1 2.018	; 0.789	0.727	1.820	<u> 51.9</u>
Carbon Disulfide	3.268	5.522	3.426	3.395	3.240;	3.370;	3.5
1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethene(Total)_ Chloroform	_* 1.530	1.462	1.482	1.398	1.330	1.440	5.44
1,1-Dichloroethane	_= 3.975	1 4.156	4.429	4.346	4.411;	4.263	4.6
[1, I-Dichloroethene(Total)_	1.569	1.503	1.657	1.588	1.570	1.597	2.3
Uniproform	_* 3.541	3.684	3.843	3.714	3.695	8.715	2.1
1,2-Dichloroethane	_, 3.214	3.151	3.300	3,166	3.145	3.195;	2.0
2-Butanone	_, ],171	0.150	0.161	0.147	0.144	0.155;	1.Z
1,1,1-Trichloroethane	_, 0.502	0.534	9.607	0.621	0.650	0.583;	10.7
Carbon Tetrachloride	. 0.501 - 0.512	. U.542	0.603	0.600	. U.BI/;	0.5/3;	9.00 A
Vinyl Acetate	. 0.912	. 0.313	1 095	1 070	1 127	1.040	8.3
1.2-Dichloropropane	→ 0.613	0.655	0.691	0.471	C.749	0.636	16.5
cis-1,3-Dichloropropene	0.525	0.630	0.749	0.753	0.804	0.692	16.4
Trans-1.3-Dichloropropens	0.377	1 0.439	9.547	0.530	. 641	0.517	20.7
Trichloroethene	. 0.347	0.338	0.372	0.356	0.358	0.354	3.6
Trichloroethene	5.749	0.818	0.920	0.907	0.928;	0.864	9.0
'1	0.463	1 3 467	1 0 516	1 6 798	1 O K111	0 491'	
Benzene	1.272	; 1.251	1.298	1.233	! 1.227	1.256	2.3
Bremoform	<b>_</b> ≠ 0.564	; 0.600	0.697	0.698	0.720	0.656;	10.5
4-Methyl-2-Pentanone	_: 0.347	0.362	0.423	0.419	0.442	0.399	10.4
Z-Hexanone	_ 0.675	0.622	0.763	0.591	0.532	0.637	13.8
Tetrachloroethene	0.482	0.441	0.470	0.435	0.418	0.449	5.8
1,1,2,2-Tetrachloroethane	_= 0.716	1 0.672	0.747	0.737	0.757	0.726;	4.6
Chlambana	_* 9.812	; 0.795	0.834	0.788	; 0.792;	0.804;	2.31
Benzene	_→ 1.U1± r 0 475	, U.SII	1.034	0.875	, U.967)	0.3321	0.UF
		1 0.400				0.7201	
StyreneXylene (total)	_, 0.0±/	1 0.003	0.072	0.040	, U.OII; · n AO11	. 0.621, n agni	9.4: 9.2,
		~ ~ ~					~ ~ - :
Toluene-a8	023	! 1 023	 ! 1 072	1 016	1 0101	1.031	2.4
Eromofluorobenzene	0.541	0.534	0.581	0.547	0.536	0.548	3.5
Toluene-d8 Eromofluorobenzene 1,1-Dichloroethane-d4	2.442	2.433	2.559	2.460	2.415	2.462	2.3
			1		1		

# ZA VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25

Case No.: G132-001SAS No.: NA

SDG No.: BOOFH5

Instrument ID: 70

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2 Calibration Date: 4/85/91

Time: 9:07

Lab File ID: >08655

Init. Calib. Date(s):3/25/91 3/25/91

. . . . . . .

Matrix:(soil/water) WATER Level:(low/med) LDW Column:(pack/cap) CAP

Min RRF50 for SPCC(#) = 0.300 (0.250 for Bromoform) Max %D for CCC(*) = 25.05

	·	1	]
COMPOUND	RRF	IRRF50	i kD
	,	• /	
Chloromethane	<b>*</b> 919		
Bromomethane	1.467		
Vinyl Chloride			
ChloroethaneChloride	.781	. 756	
Methylene_Chloride	1 1.588		
AcetoneCarbon_Disulfide	1 .113		
Carbon_Disulfide	1 2.760		26.7
1,1-Dichlaroethene	<b>* 1.53</b> B		1 7.3 <b>*</b>
1,1-Dichloroethane	<b># 2.970</b>	1 2.783	6.3 4
1,2-Dichloroethene_(total)_	1 1.547	1.344	i 13.1
Chloroform	* 3.409		
1,2-Dichloroethane	l₌ 1.662		
2-Butanone	1 .079	1 .133	1 69.5
1,1,1-Trichloroethane	1 .631	1 .567	10.2
Carbon_Tetrachloride	1 .574	1 .508	11.6
Vinyl Acetate	1 .120	1.097	1 19.1
Bromodichloromethane	1 .770	1 .663	13.9
1,2-Dichloropropane	* .431	1 .400	1 7.2 *
cis-1,3-Dichloropropene	1 .597	1 .528	111.6
Trichloroethene	1 .456	1 .432	1 5.4
Dibromochloromethane	1 .624	1 .522	
1,1,2-Trichloroethane	1 .355		
Benzene	1 .972		
trans-1,3-Dichloropropene			
Bromoform  4-Methyl-2-pentanone	253		
2-Hexanone			
Tetrachloroethene	450		
1,1,2,2-Tetrachloroethane			
Toluene	* .782		
Chlorobenzene	# 1.D12		
Ethylbenzene			
Styrene	/75		
Xylene_(total)	.467	1 .433	7.3
Toluene-d8	1.162		
Bromofluorobenzene			
1,2-Dichloroethane-d4	1.416	1 1.477	4.4
	.!		1

## 7A VOLATILE CONTINUING CALIBRATION CHECK

> COMPOUND RRF RRF50 |Chloromethane_____# 3.040| 2.822| |Bromomethane | 1.856 | 1.756 !Vinyl Chloride * 2.253! 2.083! 7.5 *|Chloroethane____| 1.050| 1.130| -7.6 | |Methylene Chloride_____ | 2.072; 1.891; |1,1-Dichloroethene_____* 1.440 | 1.425 | 1.0 * | 1,1-Dichloroethane_____ # 4.263 | 4.034 | 5.4 # 1,2-Dichloroethene(Total) 1.597 | 1.452; 9.1 : Chloroform____* 3.715; 3.498; |Carbon Tetrachloride | 0.573| 0.384| 33.0 |Vinyl Acetate_____ | 0.531 | 0.680 | 28_1 Trans-1,3-Dichloropropene__; 0.517; 0.336 <u>35.0</u> Trichloroethene | 0.354; 0.397; -12.2 Dibromochloromethane 0.864 0.526 39 1,1,2-Trichloroethane | 0.491; 0.348 29.1 Benzene_____Bromoform____ ___| 1.256; 1.151; 8.4 ; # 0.656; 0.330; 49.7 # | 4-Methyl-2-Pentanone | 0.399 | 0.190 | 52.4 | 2-Hexanone | 0.637 | 0.490 | 23.1 | |Tetrachloroethene____ ___| 0.449| 0.380| 15.4 | {1,1,2,2-Tetrachloroethane__# 0.726; 0.570; 21.5 # * 0.804¦ 0.776¦ 3.5 * |Toluene_ |Chlorobenzene_____# 0.992; 0.919; 7.9 * _____ 0.827 0.889 -7.5 !Styrene____ |Toluene-d8_____| 1.031| 1.154|-11.9

# VOLATILE ORGANICS ANALYSIS DATA SHEET

0100 EPA SAMPLE NO.

VBLK02 116

Lab Name: MARTINMARIETTA Contract: 0288

Lab Code: K-25 Case No.: G132-001 SAS No.: ____ SDG No.: BOOFH5

Matrix: (soil/water) WATER_ Lab Sample ID: 910410-052

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VBK0410

Level: (low/med) LOW___ Date Received: _____

Date Analyzed: 04/10/91 % Moisture: not dec. _____

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg)	UG/L	Q	
74-87-3	Chloromethane_		1	J ×5=	5
74-83-9	Bromomethane		10	Ū	
75-01-4	Vinyl Chloride		10	Ū	•
75-00-3	Chloroethane	·	10	Ū	į
75-09-2	Methylene Chlo	ride	5		- 1
67-64-1	Acetone	1	18	X10=	180
75-15-0	Carbon Disulfi	de	5	Ū	; !
75-35-4	1,1-Dichloroet	thone	5	Ü	
75-33-4	i,i-Dichloroe	iteliei	5	ָ ט	1 5
10-04-0	1,1-Dichloroet	nane	5 5	• •	i t
54U-59-U	1,2-Dichloroet	nene(Total)		U	į
107 06 0	Chloroform		5	U	į
70 03 3	1,2-Dichloroet	cnane	5 3	ָּטְ :	i t
71 55 6	2-Butanone		ى 5	J	į t
11-00-0	1,1,1-Trichlor	coetnane	ວ		İ
56-23-5	Carbon Tetrach	lloride		ן ט	į
108-05-4	Vinyl Acetate_		10	¦ Ŭ	į
75-27-4	Bromodichlorom	ethane	5	ן ט	:
78-87-5	1,2-Dichloropr	ropane	5	ដូប	į
10061-01-5-	cis-1,3-Dichlo	ropropene	5	; U	;
10061-02-6-	Trans-1,3-Dich	loropropene	5	ָיָ ט	:
79-01-6	Trichloroether	ne!	5	ן ט	!
124-48-1	Dibromochlorom	methane!	5	¦ Ü	!
79-00-5	1,1,2-Trichlor	coethane	5	¦ U	:
71-43-2	Benzene		5	Ü	1
75-25-2	Bromoform		5	ן ט	!
108-10-1	4-Methy1-2-Per	tanone	10		
591-78-6	2-Hexanone		3	J X5=	÷/5
127-18-4	Tetrachloroeth	nene	5	J X5=	· -
79-34-5	1,1,2,2-Tetrac	chloroethane	1	J X5	= 5
108-88-3	Toluene	1	5	U	•
108-90-7	Chlorobenzene		5	Ü	•
100-41-4	Ethylbenzene_		5	ับ	1
100-41-4	Styrene		5	Ü	·
, 100-42-3 ! 1330-20-7	Xylene (total)			; U	1
1000-20-1	Ayrene (cotar)	/	S	10	

### SEMI-VOLATILE ORGANIC DATA VALIDATION CHECKLIST - FORM A-2

province = 40.4	1. A	D	1-1-
PROJECT: 700 BP1	REVIEWER: En	DATE:	5/47
LABORATORY: X ZS	CASE:	SDG: 15/10	11-115
SAMPLES/MATRIX:			
BODFH5 19	794 Max	2	
			<del></del>
	<u> </u>		
1. DATA PACKAGE COMPLETENESS	,		
Review the data package for completeness a elements are missing contact the laboratory		f any data revie	ew
Data Package Item	Present?:	Yes No	N/A
Case Narrative		<u> </u>	
Data Summary	•		
Chain-of-Custody		<u> </u>	
QC Summary		_	
Surrogate report		<u> </u>	/
MS/MSD report		/ <i>_</i>	
Blank summary report		<u> </u>	
GC/MS tuning report		<del></del>	
Internal standard summary report	5 <del>.</del>		
Sample Data			
Sample reports		<u> </u>	
TIC reports for each sample RIC reports for all samples			
Raw and corrected spectra for all de	started recults	<del>-</del>	
Raw and corrected spectra for an de		<del>-</del> -	
Quantitation and calculation data for			
Standards Data	m. 110	 ز م	
Initial calibration report		1	
RIC and quantitation reports for init	ial calibration		
Continuing calibration reports		V	
RIC and quantitation reports for con	it. calibrations	V	
Internal standard summary report			<u>-</u> _
Raw QC Data	·		<del></del>
Tuning report, spectra and mass list	s		
Blank analysis reports			· <del></del> ·
TIC reports for all blanks		<u></u>	_ <del></del>
RIC and quantitation reports for blan			
Raw and corrected spectra for all de		$\checkmark$ $-$	
Raw and corrected library search da			
Quantitation and calculation data for	all TIC	<i>-</i>	<u> </u>
MS/MSD report forms			

Data Package Item	Present?:	Yes	No	N/A
RIC and quantitation reports for MS/MSD Additional Data Moisture/% solids data sheets Reduction formulae Instrument time logs Chemist notebook pages Sample preparation sheets				
2. HOLDING TIMES				
Were all samples extracted within holding time?		Yes	No	) N/A
Were all samples analyzed within holding time?	•	Yes	No	N/A
ACTION: If any holding times were exceeded, but not by grassociated samples as estimated (J for detects or UJ for nonder (R) and qualify all associated detects as estimated (J).				
3. INSTRUMENT CALIBRATION, TUNING AND PERFO	ORMANCE CH	ECKS		
3.1 GC/MS TUNING AND PERFORMANCE CHECKS				
Is a DFTPP tune report present for each applicable 12h period	d?	Yes	No.	N/A
Do all tunes on all instruments meet the tuning criteria?		Yes _	∑ No	N/A
Do all tunes on all instruments meet the expanded criteria?		Yes	No	MIA
Has the laboratory made any calculation or transciption errors	s?	Yes	No	N/A
Have the proper significant figures been reported?		Yes	)-No	N/A
ACTION: If the mass calibration is out of specification but vassociated data as estimated (J for detects and UJ for nondetect qualify all associated data as unusable (R).				
3.2 INITIAL CALIBRATION				
Is an initial calibration report provided for all instruments?		Yes	No.	N/Å
Are all RSD values ≤30% (2/88 SOW)?		Yes	No	N/A
Are all RRF values ≥0.05 (2/88 SOW)?		Yes	_ No	N/A
. Are all applicable RSD values ≤20.5% (3/90 SOW)?		Yes	No (	N/A
Are all applicable RSD values ≤40% (3/90 SOW)?	•	Yes	No	(N/A)

Are all applicable RRF values within SOW limits (3/90 SOW)?

Yes No

N/A

Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?

Yes

No

N/A

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to four TCL compounds or surrogates, if any RRF value is out of specification qualify all detected results for the particular compound as estimated (I) and all nondetects as unusable (R). Making allowances for up to four TCL compounds or surrogates, if any RSD value is out of specification qualify all associated data as estimated (I for detects or UI for nondetects).

#### 3.3. CONTINUING CALIBRATION

Is a continuing calibration report present for all 12-h periods in which associated samples were analyzed?

Yes

No

N/A

Are all RRF values ≥0.05 (2/88 SOW)?

Yes No

N/A

Are all %D values  $\leq 25\%$  (2/88 or 3/90 SOW)?

Yes

 $(N^{\circ})$ 

N/A

Are all %D values  $\leq 40\%$  (3/90 SOW)?

Yes

- . -

N/A

Are all RRF values within SOW limits (3/90 SOW)?

Yes

No

21/4

Are all erratic performance compound RRF values ≥0.01 (3/90 SOW)?

Yes

ACTION: With the exception of compounds that exhibit erratic performance and making allowances for up to four TCL compounds or surrogates, if any RRF value is out of specification qualify all associated detected results as estimated and all nondetects as unusable (R). Making allowances for up to four TCL compounds or surrogates, if any %D is out of specification, qualify all associated results as estimated (J for detects or UJ for nondetects).

#### 4. BLANKS

### 4.1 LABORATORY BLANKS

Has the laboratory conducted a method blank analysis per matrix for every extraction batch?

Yes

N/A

Are compounds reported in the laboratory blanks?

Yes

 $\supseteq$  N/A

ACTION: Qualify all sample results < 10 times the highest blank concentration for the common laboratory contaminants, as nondetects (U) or at the SQL if the result is < CRQL. Qualify all remaining sample results < 5 times the blank concentration in similar fashion.

### 4.2. FIELD BLANKS

Are compounds reported in the field blanks?

Yes

ACTION: Qualify all detected sample results <5 times the amount in any valid field blank as nondetects (U) and note the results of the field blanks in the validation narrative.

### 5. ACCURACY

### 5.1 SURROGATE RECOVERY/SYSTEM MONITORING COMPOUND RECOVERY

Are any surrogate recoveries out of specification? N/A Are any surrogate recoveries < 10%?

Are any method blank surrogate recoveries out of specification?

ACTION: Qualify all associated data as estimated (I for detects and UI for nondetects) if at least two semivolatile surrogates are out of specification. If any surrogate is below 10% recovery qualify associated detected results as estimated (J) and associated nondetect results as unusable (R). If method blank surrogates are out of specification and associated sample surrogates are acceptable no qualification is required, however, the laboratory should be contacted for an explanation.

### 5.2 MATRIX SPIKE RECOVERY

Has an MS/MSD analysis been conducted per matrix in the sample group? Are MS/MSD recoveries within specification? Yes Are there any calculation errors? Yes

ACTION: If an MS/MSD analysis has not been conducted contact the laboratory for an explanation. Review the MS/MSD recoveries in conjunction with other QC data such as surrogate recoveries and note the results in the validation narrative. If MS/MSD recoveries are out of specification and sample concentration is > 5 times the spike concentration, no qualification is required, otherwise qualify results as follows: Qualify positive results for the specific class of compound (aromatics and nonaromatics) as estimated (I) in all samples if associated surrogates are also out of specification. The qualification shall only be done on samples of similar matrix as the MS/MSD samples. If it is determined from the review that only the spiked samples are affected by low recoveries, qualify only the results for the spiked sample as described above. If it is determined from the review that out of specification MS/MSD recoveries are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

### 5.3 PERFORMANCE AUDIT SAMPLES

Are the results for the performance audit samples within the acceptance limits?

Yes No



ACTION: Note the results of the performance audit samples in the validation narrative.

#### 6. PRECISION

### 6.1 MATRIX SPIKE/MATRIX SPIKE DUPLICATES

Are all RPD values within specification?

Yes No

N/A

Are there any calculation errors?

Yes

No C

ACTION: Review the MS/MSD results in conjunction with other QC data such as field duplicates and note the results in the validation narrative. If MS/MSD RPDs are out of specification and sample results are >5xCRQL qualify positive results for the specific class of compound (aromatics and non-aromatics) as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

### 6.2 FIELD DUPLICATE SAMPLES

Are field duplicate RPD values acceptable?

Yes 1

N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

### 6.3 FIELD SPLIT SAMPLES

Are field split RPD values acceptable?

Yes

No

N/A

ACTION: Note the results of the field split samples in the validation narrative.

#### SYSTEM PERFORMANCE

#### 7.1 INTERNAL STANDARDS PERFORMANCE

Are any internal standard area counts outside the acceptance limits?

Yes No

N/A

Are retention times for any internal standard outside the ±30 second windows established by the most recent calibration check?

Yes No

ACTION: If the area counts are outside the acceptance limits qualify all associated results as estimated (J for detects and UJ for nondetects. If it is determined from the review that out of specification area counts and relative retention times are indicative of systematic problems within the laboratory the reviewer may consider rejection of all affected sample data (R).

### 8. COMPOUND IDENTIFICATION AND QUANTITATION

### 8.1 COMPOUND IDENTIFICATION

Are detected compounds within ±0.06 relative retention time units of the associated calibration standard?	Yes	No N/A
Are all ions at a relative intensity of ≥10% in the standard spectra present in the sample spectra?	Yes	No N/A
Do the relative intensities between the standard and sample spectra agree within 20%?	Yes	No N/A
Have all ions > 10% in the sample spectra that are not present in the standard spectra been reviewed for possible background contamination?	Yes	No N/A
Are molecular ions in the reference spectrum present in the sample spectrum?	Yes	No N/A

ACTION: If compound identification is in error and retention time and mass spectral criteria are exceeded qualify all affected positive results as unusable (R). If cross-contamination between analyses is suspected, qualify affected data as unusable (R).

### 8.2 REPORTED RESULTS AND QUANTITATION LIMITS

Has the laboratory used the correct RRF values and internal standards for quantitation?	Yes No	N/A
Are results and quantitation limits calculated properly?	Yes No	N/A
Has the laboratory reported the sample quantitation limits within 5xCRQL values?	Yes No	N/A

ACTION: If the quantitation limits are in error contact the laboratory for clarification and note in the validation narrative.

#### 8.3 TENTATIVELY IDENTIFIED COMPOUNDS

Has the laboratory conducted a spectral library search on all candidate TIC peaks in accordance with the analytical SOW?

Yes No N/A

Has the laboratory properly identified and coded all TIC?

Yes No N/A

ACTION: If the laboratory has failed to search the minimum number of TIC peaks in the chromatogram contact the laboratory for submittal of the required data. Qualify as nondetects (U) all TIC compounds present in samples and blanks using the review criteria specified in the validation requirements. If TIC identification is in error sample results should be qualified as nondetects (U) or unusable (R). If TIC identifications are judged valid, qualify the results as presumptive and estimated (JN).

### 9. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Yes No N/A

Were project specific data quality objectives met for this analysis?

Yes No N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

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SDG: 16AF45	REVIEWER:	KMA		DATE: 3/	15/42		PAGEOF	
COMMENTS: 5V								
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER	
BEDFHS	BNA	3/27/41	4/3/91	4/11/91	//	4	WI	
BOOFGY		4/3/91	4/11/91	4/15/41	8	4	at	
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7B SEMIVOLATILE CONTINUING CALIBRATION CHECK

Asgol W/BODFHS

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No.: G132-0315AS No.: NA SDG No.: HA

Instrument ID: 70 #3 Calibration Date: 4/11/91 Time: 8:14

Min RRF50 for SPCC( † ) = 0.050

Max %D for ECC(*) = 25.

		HOX	AD . 01		
	RRF I	RRF50	l ! %D	1 	
		9=====	9×====	<b>/</b> /_	
!Pheno!	1.9991	2.108 ^t	1/5.40	*/	
lbis(2-Chloroethyl)ether	1.7524	´ 2.088′	<b>ピ 19.2レ</b>	1	
12-Chlorophenol				1	
11,3-Dichlorobenzene	1.3741	1.537	1 11.9	1	
11,4-Dichlorobenzene*	1.231	1.366		*	
Benzyl_alcohol	.9071	.928		1	
11,2-Dichlorobenzene	1.198	1.313		1	
12-Methylphenol	1.310	1.550			
lbis(2-chloroisopropyl)ether	2.9021	3.231		!	
14-Methylphenol	1.2461	1.208		1	
4-Methylphenol  N-Nitroso-di-n-propylamine_	1.464	1.380		#	
Hexachloroethane	.577	.578	ı .0	1	
Nitrobenzene	.505			i	
Nitrobenzene	1.092	1.128		I	
12-Nitrophenol	• .247			*	
12,4-Dimethylphenol	.452∃			1	
Benzoic_acid	.226			1	
lbis(2-Chloroethoxy)methane_					
12,4-Dichlorophenol	* .332				
11,2,4-Trichlorobenzene				1	
Naphthalene	940			!	
14-Chloroaniline	517			1	
Hexachlorobutadiene				*	
14-Chloro-3-methylphenol	420			*	
12-Methylnaphthalene				1	
					_
12,4,6-Trichlorophenol				- 111	
12,4,5-Trichlorophenol	. 339		1 <u>20</u> 0		
12-Chloronaphthalene	! 1.174	1.228			
12-Nitroaniline	.651			Mary 8/15/	
Dimethylphthalate	1 1.316	1.510		Bulk	_
Acenaphthylene	1 1.609	1.842		· Mari	161/
12,6-Dinitrotoluene				1 // 1/5/	·
13-Nitroaniline	.382			[ NI.,	
Acenaphthene	* 1.111	1 1.148	1 3.3		
12,4-Dinitrophenol				#	
4-Nitrophenol	# .±64 i		3,5	# !	
1	'	· ———	<del></del>	, <b>'</b>	

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Assoc gut

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No:G132-001C SAS No.: NA SDG No:BOOFH5

Instrument ID: 70 #3 Calibration Date(s):04/15/91 04/15/91

Min RRF for SPCC(\$) = 0.850

Max %RSD for CCC(*) = 30.0

LAB FILE ID:							
COMPOUND	LRRE20	I SRESA	IRRF80	RRF120	IRRE1401	RRF	% RSD
!Pheno!	· 2.659	1 1.796	1 1 813	l 1.786	1.7001	1.951	20.4
lbis(2-Chloroethyl)ether	1 2 642	1.959	1.643	1 1 263	1.1651	1.734	34 F
12-Chlorophenol							
11,3-Dichlorobenzene	1.907	1 1 496	1 319	. 1 338	1.3081		
11,4-Dichlorobenzene	1 714	1 1 402	1 124	1 1 057	1.047		
Benzyl_alcohol						.907	
11,2-Dichlorobenzene	1.760	1.339	1.220	1 1.284	1.135		
12-Methylphenol	2.166	1.516	1.413	1.595	1.6081		
lbis(2-chloroisopropyl)ether	3.849	1 2.760	2 783	3.040		3.085	
14-Methylphenol	1 779	1.181					
14-Methylphenol   IN-Nitroso-di-n-propylamine_=	1.876	1.325			1.7381		
Hexachloroethane	.722	. 555			-	.591	
Hexachloroethane	.654	.525			1 .7901		17.5
Isophorone	1.394	1 1.094	1.183	1.297	1.3351	1.261	9.£
12-Nitrophenol	€ .337	1 .266	.280	1 .289	1 .2961	.294	9.1
12.4-Dimethylphenol	.583	.461	.488	.538	.5321	.520	9.1
Benzoic acid	0.000	1 .259	1 .257	1 .300	180€. ∣	.281	9.4
lbis(2-Chloroethoxy)methane_	.878	1 .663	.726	.810	.8241	.780	10.5
12,4-Dichlorophenol	• .425	.336	1 .325	.336	.3261	.350	12.1
1,2,4-Trichlorobenzene			.313	.324		.338	15.5
Naphthalene	1.151	1 1.029	.886	1 .885	.8761	.965	12.t
14-Chloroaniline		1 .559	.548	.602	1808.	.601	9.8
exaciiioi obditaditeile	* .207		.155	1 .154		.164	
14-Chloro-3-methylphenol	.564		.461	1 .501	.4991	. 493	9.£
12-Methylnaphthalene	1 .773				.5 <del>9</del> 41		24.5
Hexachlorocyclopentadiene						.295	
12,4,6-Trichlorophenol	* .535	i .420				. 479	
							25.4
12-Chloronaphthalene							
12-Nitroaniline	0.000	1 .688				.740	
Dimethylphthalate	1.477	1.551				1.308	
Acenaphthylene	1 2.434	1.936	1.495			1.687	
12,6-Dinitrotoluene	.453	1 .377				. 365	
13-Nitroaniline	0.000	.316					31.
Acenaph thene	* 1.412	1.190					
12,4-Dinitrophenol	0.000	.226					12.3
4-Nitrophenol	0.000	1 .203	.211	.239	.231	.221	7.5
	,	¹	·	1	! i ,		

Mr8/15/90

6C SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: MARTIN MARIETTA

Contract: 0288

Lab Code: K25 Case No.: G132-001C SAS No.: NA SDG No.: BOOFH5

Instrument ID: 70 #3 Calibration Date(s):04/15/91 04/15/91

Min RRF for SPCC(#) = 0.050

Max %RSD for CCC(*) = 30.0

LAB FILE ID:							
		IRRF50	RRF80		RRF160	RRF	% RSD
	1 2.129 1 .753 1 1.877 1 1.372 1 0.000 1 0.000 * .667 1 .260 1 0.000 1 1.073 1 1.174 1 2.066 * 1.392	1.721   .597   1.402   .564   1.109   .402   .150   .265   .265   .265   .265   .974   1.597   1.598	1.480 .571 1.002 .360 .790 .422 .138 .440 .183 .237 .168 .925 .730 1.421	1.561   .616   .874   .296   .778   .526   .105   .405   .405   .230   .182   .977   .667   1.358   .978	1 1.287 .562 .562 .687 .196 .659 .426 .081 .384 .177 .206 .154 .824 .629 .629 .1.320 .945	1.636 .628 .425 .944 .119 .484 .257 .257 .9635 1.635 1.636	19.4 12.5 49.7 31.1 12.5 26.2 23.9 17.1 18.7 11.0 127.6 19.7 1 17.3
IPyrene  Butylbenzylphthalate  3,3'-Dichlorobenzidine  Benzo(a)anthracene  Chrysene  bis(2-Ethylhexyl)phthalate  Di-n-octylphthalate  Benzo(b)fluoranthene  Benzo(k)fluoranthene	2.125   1.508   .314   1.679   1.330   1.980 * 2.759   1.664   .893 * 1.262   .997   .546	1.649   1.179   .224   1.334   1.142   1.572   2.516   1.510   .778   1.106   .907   .494   .796	1 1.676 1 1.183 1 .232 1 1.258 1 1.039 1 1.559 1 1.844 1 1.440 1 .584 1 .951 1 .876	1.984   1.458   .272   1.514   1.189   1.701   1.775   1.298   .824   .967   .923   .498	2.394    1.807    .270    1.713    1.274    1.849    1.749    1.065    .672    .908    .908    .499	.262 1.500 1.195 1.732 2.128 1.396 .750 1.045 .922 .503	18.3   13.5   13.5   9.5   10.5   10.5   16.3   16.3   16.3   13.5   4.5   4.5
INitrobenzene-d5 12-Fluorobiphenyl ITerphenyl-d14 IPhenol-d6 12-Fluorophenol 12.4,6-Tribromophenol	.768   1.711   1.285   2.994   1.872	.595   1.335   1.019   2.208   1.558	i 1.066 i .984 i 1.888 i 1.396	1.015   1.166   1.896   1.504   .132	.624    .813    1.184    1.787	.659 1.188 1.128 1.129 2.155 1.617	1 10.2 1 29.2 1 11.0 1 23.0 1 11.9

(1) Cannot be separated from Diphenylamine

7B SEMIVOLATILE CONTINUING CALIBRATION CHECK

W/MOF94

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No.: G132-091SAS No.: NA SDG No.: H

Instrument ID: 78 #3 Calibration Date: 4/15/91 Time: 6:31

Min RRF50 for SPCC(#) = 0.050

Max %D for CCC(*) = 25.0%

	·	1 1		
I I COMPOUND	RRF	IRRF50 I	i %aD i	
Phenoi	1.951	<i>'</i>	7.9	
bis(2-Chloroethyl)ether				<b>,</b>
12-Chlorophenol				
11,3-Dichlorobenzene	1.474			
	1.269			· - •
11,4 01011101101120110	4.20/			•
Benzyl_alcohol				
11,2-Dichlorobenzene				
2-Methylphenol				
bis(2-chloroisopropyl)ether				·
4-Methylphenol				
N-Nitroso-di-n-propylamine_4				•
Hexachloroethane	.591			
Nitrobenzene				
Isophorone				
	* .294			
12,4-Dimethylphenol				
Benzoic_acid		=		-
<pre>ibis(2-Chloroethoxy)methane_</pre>				
12,4-Dichlorophenol	* .35G		· · · · -	<u>•</u>
11,2,4-Trichlorobenzene			•	Ì
Naphthalene	965	1 1.029		1
14-Chloroaniline	.601	1 .559	7.0	l
Hexachlorobutadiene	* .164	1 .166	1.2 4	•
14-Chloro-3-methylphenol	<b>• .493</b>	1 .440	10.8	•
12-Methylnaphthalene		1 .596	1 24.0	[
Hexachlorocyclopentadiene	.295	1 .280	5.1	<b> </b>
12,4,6-Trichlorophenol	* .479	1 .420	12.3	11.4
12,4,5-Trichlorophenol	1 .367	1 .485	1 32.1	1 2/45
12-Chloronaphthalene	1.216	1 1.276	4.9	* <i>I</i>
12-Nitroaniline	.740			Ι.
Dimethylphthalate		1 1.551	1 18.6	i
Acenaphthylene				I
12,6-Dinitrotoluene	.365			I
13-Nitroaniline				Ϊ <i>Λ</i>
	* 1.074			· 1.18
	£ .271			
	.221			* Mar 19
1		1		ї И/У/Ч

### 70 SEMIVOLATILE CONTINUING CALIBRATION CHECK .

250 W/RDF94

Lab Name: MARTIN MARIETTA

Contract:0288

Lab Code: K25 Case No.: G132-001SAS No.: NA SDG No.: NA

Instrument ID: 70 #3 Calibration Date: 4/15/91 Time: 6:31

Lab File ID: >11305 Init. Calib. Date(s):04/15/91 04/15/91

Min RRF50 for SPCC(*) = 0.050

Max %D for CCC(*) = 25.0%

		1 1		• 1
COMPOUND	ı <del>RRF</del>	IRRF50 I	. %D	i İ
Dibenzofuran	1.636	-		
2,4-Dinitrotoluene				1 , ,
Diethylpnthalate				1 11
4-Chlorophenyl-phenylether_				1/45
Fluorene	1 .942			
4-Nitroaniline	444			المدين إيرا
4,6-Dinitro-2-methylphenol_				1/11/
N-Nitrosodiphenylamine_(1)_	* .484			* - /
4-Bromophenyl-phenylether				1
Hexachlorobenzene				i
Pentachlorophenol	* .176			*
Phenanthrene				1
Anthracene				[
Di-n-butylphthalate	1, 553			İ
Fluoranthene	* 1.076	1 1.098		*
Pyrene				1
Butylbenzylphthalate				i İ
13,3'-Dichlorobenzidine				1
Benzo(a)anthracene	1.500			1
Chrysene	1.195			i i
lbis(2-Ethylhexyl)phthalate_			• • •	
Di-n-octylphthalate	* 2.128			<b>*</b>
Benzo(b)fluoranthene				1
Benzo(k)fluoranthene				1
Benzo(a)pyrene				* ///.
Indeno(1,2,3-cd)pyrene	1 922	907		i Miller
Theno(1,2,5=cd)pyrene  Dibenz(a,h)anthracene				1 Mil 141
Benzo(g,h,i)perylene	822			1 1/1/1/6
leacecerecesessessesses		//0	 EEEEEE	1 01151
	1 .659	.595	1 9.7	1
Nitrobenzene-d5  2-Fluorobiphenyl				1
				1
Terphenyl-d14				; 1
Phenol-d6				1
12-Fluorophenol		· · · · · · · · · · · · · · · · · · ·		1
12,4,6-Tribromophenol		1 .197	1	1
1	·' <del></del>	· † <del></del>	'	,1

(1) Cannot be separated from Diphenylamine

### PESTICIDE/PCB DATA VALIDATION CHECKLIST - FORM A-3

PROJECT: 200-130-1	REVIEWER: And	DATE: S/S/57
LABORATORY: 25	CASE:	SDG: SCEPHS
SAMPLES/MATRIX:		
1300 - 115 /5	54	-
		·

### 1. DATA PACKAGE COMPLETENESS

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for resubmittal.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative		<u> </u>		~ <del></del>
Data Summary			_ <u></u>	
Chain-of-Custody		1		
QC Summary		_		
Surrogate report		<u></u>		
MS/MSD report				<del></del>
Blank summary report		<u> </u>		
Sample Data	•			
Sample reports	9.	سكند	. —	
Chromatograms		1		
GC integration reports		<u></u>		
Worksheets			1	
UV traces from GPC				<u> </u>
GC/MS confirmation spectra				<u> </u>
Standards Data			_	
Pesticides Evaluation Standards Summary		<u></u>		
Pesticides/PCB Standards Summary		1		
Pesticides/PCB identification				
Pesticides standard chromatograms		1		
Raw QC Data				
Blank analysis report forms and chromatograms		<u></u>		
MS/MSD report forms and chromatograms				

Data Package Item	Present?:	Yes	No	N/A
Additional Data  Moisture/% solids data sheets  Reduction formulae  Instrument time logs  Chemist notebook pages  Sample preparation sheets				
2. HOLDING TIMES	•			
Were all samples extracted within holding time?		Yes	No	N/A
Were all samples analyzed within holding time?		Yes	No	N/A
ACTION: If any holding times were exceeded, but not by associated samples as estimated (J for detects or UJ for nor (R) and qualify all associated detects as estimated (J).				
3. INSTRUMENT PERFORMANCE AND CALIBRATIO	SNC			
3.1 INSTRUMENT PERFORMANCE (2/88 SOW)				
Are DDT retention times greater than 12 minutes?		Yes	No .	N/A
ACTION: If DDT retention time is $\leq$ 12 minutes and resounusable (R).	olution is <25%	qualify as	sociated	l data as
Is resolution between DDT peaks acceptable?	` <del>s</del>	Yes	_No	N/A
ACTION: If resolution between DDT peaks is unacceptab	le qualify associa	ted data a	s unusa	ble (R).
Do all pesticide standards elute within the established retention time windows?		Yes (	No	_N/A
ACTION: If the standards do not meet the retention time within the retention time windows no sample qualification the retention time windows and the standards and matrix spretention time windows calculated according to the validations ample results from the last in-control point as unusable (R	is necessary. If points is necessary. If points is necessary. If points is necessary. If points is necessary.	peaks are within the	near or expand	within ed
Are DDT breakdowns ≤20%?	1	Yes	No ,	N/A
ACTION: If the DDT percent breakdown exceeds 20%, q estimated (J) and all nondetects as unusable (R) if DDD an all results for DDD or DDE as presumptive and estimated	d DDE are detect			
Are endrin breakdowns <20%?		Yes	) No	N/A

ACTION: If the endrin breakdown exceeds 20%, qualify all detected results for endrin as estimated (J) and all nondetects as unusable (R) if endrin aldehyde or endrin ketone are detected. In addition, qualify all results for endrin ketone as presumptive and estimated (NJ).

Are DBC retention time differences within specification?

Yes No N/A

ACTION: If DBC %D values are outside the limits and the shift is occurring repeatedly in samples and standards, qualify affected sample results as unusable (R).

### 3.2 CALIBRATIONS (2/88 SOW)

Are RSD values for aldrin, endrin, DDT and DBC ≤10%?	Yes No	N/A
Have all standards been analyzed within 72 h of any sample?	Yes No	N/A
Has a 3-point calibration been conducted for DDT or toxaphene?	Yes No	N/A
Have all standards been analyzed at the start of each 72-h sequence?	Yes No	N/A
Have evaluation standards A, B, and C been analyzed within 72 h of any sample?	Yes No	N/A
Has the confirmation standard mix been analyzed after every five samples?	Yes No	(N/A)
Has evaluation standard B analyzed every 10 samples?	Yes No	N/A)
Are %D values for initial and subsequent standards ≤ 15% for quantitation standards and ≤20% for confirmation standards?	Yes No	N/A

ACTION: If the RSD criteria were exceeded or three point calibrations not conducted qualify associated detects as estimated (J). If all standards were not analyzed at the beginning of each 72-h sequence qualify associated data as unusable (R). If the confirmation standards were not analyzed properly qualify associated detects as estimated (J). If the continuing calibration criteria were not met qualify associated quantitation data as estimated (J).

#### 3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

	• • • • • • • • • • • • • • • • • • • •		
Is peak resolution acceptable?	Yes	No	N/A
ACTION: If the resolution criteria are not met, reject positive sample results calibration (R).	generai	ted aft	er initial
Are DDT and endrin breakdowns ≤20.0%	Yes	No	N/A
ACTION: If the breakdown criteria are not met qualify sample results as des of the validation requirements.	cribed i	n Sect	ion 5.3.1
Are single component target compounds in the PEMs, INDA, INDB and the calibration standards within the retention time windows?	Yes	No	N/A
ACTION: If the retention time criteria are not met and no peaks are present two times the retention time windows ( $\pm 0.04$ , $\pm 0.05$ for methoxychlor), no necessary. If peaks are present in samples within the retention time window raw data to determine expanded retention time windows (see Section 5.3.1 of requirements). If all standards and matrix spikes fall within the expanded windows then all affected sample results are qualified as unusable (	qualifica a review the valindows the do not	ition is is made is is made in its made is is made is is made in its management. It is is is in its management is is is is in its management is is is is is is is is is is is is is	de of the
Are the RPDs acceptable for the PEMs?	Yes	No	N/A
ACTION: If the RPD criteria are not met qualify associated positive sample	results a	as estir	nated (J).
Are the RSDs for the calibration factors <10.0% (<15.0% for the BHC series, DDT, endrin, and methoxychlor)?	Yes	No	N/A
ACTION: If the RSD criteria are not met qualify associated positive sample	results a	as estir	nated (J).
3.4 CALIBRATION VERIFICATION (3/90 SOW)			
Have the analytical sequence requirements been met for the analysis of instrument blanks, PEMs, INDA and INDB mixes?	Yes	No	N/A
ACTION: If the analytical sequence requirements are not followed and any or retention time criteria listed below are exceeded, reject associated positive res			on or
Is peak resolution acceptable for PEMs, INDA and INDB mixes?	Yes	No	N/A
ACTION: If the resolution criteria are not met reject positive sample results noncompliant standard analysis (R).	generate	ed afte	r a

Are single component target compounds in the PEMs, INDA and INDB mixes within the retention time windows?

ACTION: If the retention time criteria are not met and no peaks are present in the samples analyzed after the noncompliant standard within two times the retention time windows ( $\pm 0.04$ ,  $\pm 0.05$  for methoxychlor), no qualification is necessary. If peaks are present in samples within the expanded windows rejected associated positive and nondetect results (R).

Are RPDs between the calculated and true amounts in the PEMs, INDA and INDB mixes ≤25.0%?

Yes

N/A_

ACTION: If the RPD criteria are not met qualify associated positive sample results as estimated (J).

Are DDT and endrin breakdowns in the PEMs ≤20.0% (≤30.0% total combined)?

Yes No

N/A

ACTION: If the breakdown criteria are not met qualify associated positive sample results in accordance with the criteria specified in Section 5.3.1.

#### 4. BLANKS

#### 4.1 LABORATORY BLANKS

Has the laboratory analyzed the method blanks at the required frequency?

N/A

Has the laboratory analyzed a sulfur clean-up blank if required?

Yes

o (N

Has the laboratory analyzed instrument blanks at the required frequency?

Yes

No

(N/A)

Are target compounds present in the blanks?

Yes

No N/A

ACTION: Qualify all associated positive results as nondetects (U) that are <5 times the highest concentration in any acceptable blank.

#### 4.2 FIELD BLANKS

Are target compounds present in the field blanks?

Yes

No

N/A

ACTION: If target compounds are present in the field blanks qualify all positive sample results <5 times the highest valid field blank concentrations as nondetects (U) and note the results in the validation narrative.

#### ACCURACY

#### 5.1 SURROGATE RECOVERY

Are any surrogate recoveries out of specification?

Yes No N/A

Do any samples show nondetects for surrogates?

Yes No N/A

Are any method blank surrogates out of specification?

Yes No N/A

ACTION: Qualify all associated sample results as estimated (J for detects and UJ for nondetects) for surrogates out of specification. If the surrogate was not detected (0% recovery) in the sample qualify associated nondetects as unusable (R). If method blank surrogates are out of specification and sample surrogates are acceptable, no qualification is required however, the laboratory should be contacted for an explanation.

#### 5.2 MATRIX SPIKE RECOVERY

Has the laboratory analyzed a MS/MSD per matrix for the the sample group?

Are MS/MSD recoveries within specification?

Are there any calculation or transcription errors?

Yes No N/A

Yes No N/A

ACTION: If MS/MSD analyses have not been conducted contact the laboratory for clarification. Review the MS/MSD recoveries in conjunction with other QC data such as surrogate recoveries and note the results in the validation narrative. If MS/MSD recoveries are out of specification and sample concentration is > 5 times the spike concentration, no qualification is required, otherwise qualify results as follows: Qualify positive results as estimated (J) in all samples if associated surrogates are also out of specification. The qualification shall only be done on samples of similar matrix as the MS/MSD samples. If it is determined from the review that only the spiked samples are affected by the low recoveries, qualify only the results for the spiked sample as described above. If it is determined from the review that out of specification MS/MSD recoveries are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

#### 5.3 PERFORMANCE AUDIT SAMPLES

Are performance audit sample results within the acceptance limits?

Yes No

(N/A)

ACTION: Note the results of the performance audit samples in the validation narrative.

#### 6. PRECISION

#### 6.1 MATRIX SPIKE/MATRIX SPIKE DUPLICATE SAMPLES

Are the RPD	values	within	specification?
-------------	--------	--------	----------------

Yes No N/A

ACTION: Review the MS/MSD results in conjunction with other QC data such as field duplicates and note the results in the validation narrative. If MS/MSD RPD values are out of specification and sample results are >5xCRQL qualify positive results as estimated (J). If it is determined from the review that out of specification MS/MSD results are indicative of systematic problems in the laboratory such as sample preparation or sample-specific matrix interferences this must be noted in the validation narrative along with the potential affect on the sample results.

#### 6.2 FIELD DUPLICATE SAMPLES

Are field duplicate RPD values acceptable?

Yes No

N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

#### 6.3 FIELD SPLIT SAMPLES

Are field split RPD values acceptable?

Yes No

Yes

N/A)

ACTION: Note the results of the field split samples in the validation narrative.

#### 7. COMPOUND IDENTIFICATION AND QUANTITATION

#### 7.1 COMPOUND IDENTIFICATION

concentrations > 10 ppm?

Do positive results meet the retention time window criteria?

Yes No N/A

Were positive results analyzed on disimilar columns?

If dieldrin and DDE were reported was a 3% OV-1 column used for confirmation (2/88 SOW data only)?

Yes No N/A

Do retention times and relative peak height ratios match the expected patterns for multipeak compounds (PCB, toxaphene or chlordane)?

Yes No N/A

Has GC/MS confirmation been conducted on sample extract

ACTION: If positive results do not meet the retention time criteria qualify all detected results as nondetects as follows: If the misidentified peak is outside the retention time windows and no interferences are noted report the CRQL and if the misidentified peak interferes with a target peak then the report value is qualified as estimated and nondetected (UJ). If positive results were not confirmed on disimilar columns, reject affected results (R). If a 3% OV-1 was used to confirm dieldrin and DDE, reject the affected data (R). If PCB, chlordane or toxaphene identification is questionable qualify the results as presumptive and estimated (NJ). If GC/MS confirmation was not conducted contact the laboratory for explanation and note in the validation narrative.

#### 7.2 REPORTED RESULTS AND QUANTITATION LIMITS

Are results and quantitation limits calculated properly?

Yes No N/A

Has the laboratory reported the sample quantitation limits within 5xCRQL values?

Yes No N/A

ACTION: If results and quantitation limits are in error contact the laboratory for clarification and note in the validation narrative.

### 8. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Yes No N/A

Were project specific data quality objectives met for this analysis?

Yes No N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

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	performed due
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SDG: ROFHS	REVIEWER:			DATE: 8//	15/42		PAGE / OF [
COMMENTS:	Pe	st /F	013				
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BODFH5	Part	3/77/91	4/7/4/	5/6/41	11	29	IINI
BODF94	Rest	4/3/91	4/9/9/		6	77	none
						,	
			····				
			-				
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			"				
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# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

	REVIEWER: LIST DATE	PROJECT: 200 BP/
G: MOUFHS	CASE: SDG:	ABORATORY: Z
		SAMPLES/MATRIX:
·	1800 F94 /5	1300 FH5/6
	te,	(1/47)
<u> </u>		

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative	•	<u>''</u>		
Cover Page		<u></u>		
Traffic Reports / hain of Chestally				
Cover Page Traffic Reports (hain of lust starter Sample Data		,		,
Inorganic Analysis Data Sheets				
Standards Data				_
Initial and Continuing Calibration Verification CRDL Standard for AA and ICP		<u>سسن</u> سسيغ		
QC Summary	7			
Blanks		V		
ICP Interference Check Summary		<u></u>		
Spike Sample Recovery		i/		
Post-Digestion Spike Sample Recovery		<del></del>	1	
Duplicate		<u></u>		
Laboratory Control Sample		1		
Standard Addition Results		1		
ICP Serial Dilutions		1		
Instrument Detection Limits		i		
ICP Interelement Correction Factors		<u></u>		
ICP Linear Ranges				
Preparation Log		i		
Analysis Run Log		<u> </u>		
Raw Data		_		
ICP Raw Data		-		
Furnace AA Raw Data		<u> </u>		
Mercury Raw Data		K		
Cyanide Raw Data		<u></u>		
Additional Data				
Internal laboratory chain-of-custody			Jake Jake	
Laboratory Sample Preparation Records			_	

Data Package Item	Present?:	Yes	No	N/A
Percent Solids Analysis Records Reduction Formulae Instrument Run Logs Chemist Notebook Pages			<u> </u>	
2. HOLDING TIMES				
Have all samples been analyzed within holding times?	•	Yes	No	- N/A
ACTION: If any holding times have been exceeded quadetects and UJ for nondetects).	lify all affected res	ults as es	timated (	J for
3. INITIAL CALIBRATIONS	•			
Were all instruments calibrated daily, each set-up time as were the proper number of standards used?	nd	Yes	≥ No	N/A
Are the correlation coefficients ≥0.995?		Yes	No	N/A
Was a midrange cyanide standard distilled?		Yes	No	N/A
ACTION: Qualify all data as unusable if reported from calibrated or was calibrated with less than the minimum sample results > IDL as estimated (J) and results < IDL coefficient is < 0.995 or the laboratory did not distill the	number of standard as estimated (UJ),	ls. Qualif	fy associa	
4. INITIAL AND CONTINUING CALIBRATION VE	RIFICATION			
Are ICV and CCV percent recoveries within control?		Yes	) No	N/A
Are there calculation errors?		Yes	No	N/A
ACTION: Qualify all affected data in accordance with Scalculation errors are noted, contact the laboratory for cl		alidation	requiren	nents. If
5. ICP INTERFERENCE CHECK SAMPLE				
Has an ICS sample been analyzed at the proper frequenc	y?	Yes	No	N/A
Are the AB solution %R values within control?		Yes	<u> No</u>	N/A
Are there calculation errors?		Yes	No	N/A
ACTION: Qualify all affected data in accordance with S		alidation	requiren	nents. If

#### LABORATORY BLANKS

Are target analytes present in the laboratory blanks?

Yes No N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are > CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations < 10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

#### 7. FIELD BLANKS

Are target analytes present in the field blanks?

Yes No

N/A

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

#### 8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits?

Yes (No) N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is > 125% and sample results are < IDL no qualification is required. If spike recovery is > 125% or < 75% qualify all positive results as estimated (I). If spike recovery is 30% to 74% qualify all nondetects as estimated (UI). If spike recovery is < 30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

#### 9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits?

No

N/A

Are there calculation errors?

Yes No

N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for which the LCS %R falls within the range 50-79% or > 120%. Qualify as estimated (UJ), all sample results < IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R < 50%.

SOLID LCS - Qualify as estimated (J), all sample results > IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results < IDL for which the LCS %R are lower than the established control limits.

#### 10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits? Yes No ( N/A ACTION: Note the results of the performance audit sample analyses in the data validation narrative. 11. DUPLICATE SAMPLE ANALYSIS Are RPD values acceptable? N/A ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative. 12. ICP SERIAL DILUTION N/A Are the serial dilution results acceptable? Is there evidence of negative interference? N/A ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data. 13. FIELD DUPLICATE SAMPLES Do the RPD values exceed the control limits? N/A No ACTION: Note the results of the field duplicate samples in the validation narrative. 14. FIELD SPLIT SAMPLES Do the RPD values exceed the control limits? N/A Yes ACTION: Note the results of the field split samples in the validation narrative. 1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL Do all applicable analyses have duplicate injections? N/A Are applicable duplicate injection RSD values within control? N/A If no, were samples rerun once as required? Yes No Does the RSD for the rerun fall within the control limits? N/A Yes

No

N/A

Yes

Were analytical spike recoveries within the control limits?

If no, were MSA analyses performed when required?	Yes	No (N/A)
Are MSA correlation coefficients >0.995?	Yes	No N/A
If no, was a second MSA analysis performed?	Yes	No N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (I for detects and UJ for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (I). If the analytical spike recovery is <10%, reject all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (I for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correlation coefficient was <0.995, qualify the associated detected results as estimated (I).

#### 17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes No	N/A
Are all detection limits below the CRQL?	Yes No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

#### 18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Were project specific data quality objectives met for this analysis?

Yes No N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

Melister

COMMENTS (attach additional sheets as necessary):
110 Connect
- 10 Comments
12 1 - look
1100 8/15/97
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SDG: 1307F15 REVIEWER: / LANT Maylos DATE: 8/15/42 PAGE 10F1								
COMMENTS:	Thet							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER	
BODFHSTO	ICP	3/27/9/		7/14/91		111	noue	
	Lead			6/14/91		79		
	AISCUIC			6/18/41		83		
	Selevium			0/19/41		84		
	Thallium			1/20/9/		85		
	Mercary			4/23/9/		27	V	
	Garile			5/4/91	1	38	R	
	<i>(</i>		t _a					
1300 F94/S	ICP	4/3/9/		7/16/9/		104	nove	
/	Lend			4/14/9/	/ -	72	/	
	Arsenic			6/18/9/		76	/	
	Seleuium			6/19/4/		77	/	
,	Mullium			6/20/9/		78		
	Menuvy		/	4/23/9/		20	V	
	Garille	//	4	5/4/4/		3/	R	
	(							

# BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: KNFHS	SDG: MIFHS REVIEWER: REJUST				E: &/	15/4.2		PAC	GE / OF /
COMMENTS	Blaules								
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
	Aluminum	35-3	 		uglL	176-5		BOOFHS.	и
								BOOFH6	И
		ļ						BOOF 94	И
				<u></u>	/	/		1500F95	U
	TRON	17-9			ight	89.5	· · · · · · · · · · · · · · · · · · ·	BOOFHLO	И
					'/			1500F95	4
	Magnesium	23.2			ucill	116		Rme	
	Magnesium Sodium	112-9			//	5645		nne	
			ų.						,
									,
0									
	-								
									•

#### 5A SPIKE SAMPLE RECOVERY

SAMPLE NO.

BOOFH5S

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

____

% Solids for Sample:

0.0

Level (low/med): LOW

Concentration Units (ug/L or mg/kg dry weight): UG/L

		i	7						-i
	Control		ı			·			. 1
	Limit	Spiked Sample	- 1	Sample		Spike	i		i 1
Analyte	%R∙		c	Result (SR)	C	Added (SA)	%R	Q	M
_		1							<u>                                     </u>
Aluminum	75-125	1987.1000		33.2000	В	2000.00	97.7		P
Antimony _	75-125	488.1000	_	50.0000	Ū	500.00	97.64		P
Barium	75-125	2006.2000	_	29.0000	B	2000.00	98.9	$\overline{Z}$	<u> </u>
Beryllium	75-125	50.2000	_	0.3000	Ū	50.00	100.4	4	P
Bismuth	75-125	199.3000	_	50.0000	Ū	2000.00	10.0	N	P
Cadmium	75-125	49.9000	_	3.0000	<u>ט</u>	50.00	99.8		P NR
Calcium					_	·		_	NR
Chromium	75-125	207.3000		10.0000	<u></u>	200.00	103.64		P
Cobalt	75-125	477.6000		5.0000	Ū	500.00	95.5	Z	P
Copper	75-125	240.7000	_	4.0000	ਧ	250.00	96.34		P
Iron	75-125	1161.6000		137.8000	_	1000.00	102.4		되니니니요
Magnesium			_		_		<u></u> _	۔ ا	NR
Manganese_	75-125	506.5000	_	6.6000	BU	500.00	100.0		P
Nickel	75-125	496.7000	_	10.0000	<u>U</u>	500.00	99.3		<u>P</u>
Potassium			_		_		ļ	2	NR.
Silver _	75-125	47.9000	_	6.0000	Ŭ	50.00	95.8	<u> </u>	P_
Sodium	·				_	<u> </u>		/	<u>NR</u>
Strontium_	75-125	2323.8000		184.7000	_	2000.00	107.0	١	PIR PIR PIP
Tin	75-125	2184.2000	_	37.8000	_	2000.00	107.3		
Vanadium	75-125	521.3000	_	15.6000	<u>B</u>	500.00	101.1		<u> </u>
Zinc	75-125	493.0000	_	7.3000	B	500.00	97.1	1	P

Bi Rejected Mut 8/15/41

Comments:

# LABORATORY CONTROL SAMPLE

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25 Case No.: SAS No.:

SDG No.: BOOFH5

Solid LCS Source: UNLV-QAL

Aqueous LCS Source: SPEX

	Aqueo	us (ug/L)	;		Sol	id	(mg/kg)		
Analyte	True	Found	%R	True	Found	С	Limi	its	&R
<u>Aluminum</u>	1000.0	1018.20	101.8°		423.8	_	225.0	424.0	130.4
Antimony	1000.0	985.90	98.6	211.0	214.9	_	127.0	294.0	101.8
Barium	1000.0	992.50	99.2	4.8	6.7	<u>B</u>	0.0	40.0	139.€
<u>Beryllium</u>	1000.0	1022.50	102.2		19.9		16.5	22.3	102.€
Bismuth	200.0	199.50	99.8	400.0	63.6				15.9
Cadmium	1000.0	990.00	99.0	45.4	49.3		35.7	55.1	108.€
Calcium	1000.0	1020.40	102.0	196200.0	217895.9		166800.0	225600.0	111.1
Chromium	1000.0	1010.30	101.0		114.9		79.2	120.0	115.4
Cobalt	1000.0	988.80	98.9		158.9	_	125.0	162.0	110.3
Copper	1000.0	973.40	97.3		7025.8		6006.0	7820.0	101.7
Iron	1000.0	1034.90	103.5°		23158.3	_	17770.0	27080.0	103.2
Magnesium	1000.0	1004.40	100.4	118100.0	115566.3		100400.0	129900.0	97.9
Manganese	1000.0	1011.20	101.1	208.0	227.7	_	177.0	239.0	109.5
Nickel	1000.0	1014.00	101.4	60.9	73.9		49.2	72.6	
Potassium_	10000.0	9232.90	92.3	50.0	619.2	B	0.0	1000.0	****
Silver	1000.0	982.20	98.2	22.2	26.7	_	15.5	29.0	120.3
Sodium	1000.0	977.30	97.7	50.0	199.6	В	0.0	1000.0	399.2
Strontium	2000.0	2050.70	102.5			-			
Tin	2000.0	23.50	1.2	400.0	117.2	_			29.3
Vanadium	1000.0	1006.70	100.7		73.1	1-1	51.7	79.9	111.1
Zinc	1000.0	977.30	97.7		206.5	_	138.0	236.0	110.4

Tin Rejected

9
ICP SERIAL DILUTIONS

SAMPLE NO.

BOOFH6L

Lab Name: MARTIN MARIETTA

Contract:

Lab Code: K25

Case No.:

SAS No.:

SDG No.: BOOFH5

Matrix (soil/water): WATER

Level (low/med): LOW

Concentration Units: ug/L

1 1 1	Initial Sample		Serial Dilution		% Differ-		
Analyte	Result (I)	c	Result (S)	c	ence	Q	М
<u> </u>		]		_1		][	<u> </u>
Aluminum	24.90	<u>B</u>	100.00	ᄞ	100.0	_	<u>P</u>
Antimony	50.00	U	250.00	ᄪ		·	<u>₽</u>
Barium	28.90	B	31.50	<u>B</u>	9.0	_	<u>P</u>
Beryllium	0.30	<u>U</u>	1.50	ᄞ		1_	<u>P</u>
Bismuth	50.00	U	250.00	U			P
Cadmium	3.00	BUBBUUDID	17.50	DIBIDIDIBI			P
Calcium	37132.00		38148.50	ŀ	2.7	_	₽
Chromium	10.00	<u></u>	50.00	ਹੈ∣			P
Cobalt	5.00	UUUB	25.00	alalalalalalalalal			P
Copper	4.00	ਹ	99.00	$\overline{\mathbf{B}}$	1		P
Iron	28.70	B	32.50	$\overline{\mathbf{B}}$	13.2		P
Magnesium	11353.10		11922.00	B	5.0.	_	P
Manganese	3.80	BUBUU	5.50	国	44.7		P
Nickel	10.00	피	50.00	ᄪ		<b> </b>	<u>P</u>
Potassium	4881.20	<u>B</u>	6434.00	<u>B</u>	31.8		<u>P</u>
Silver	6.00	<u>U</u>	30.00	וַשַ			<u>P</u>
Sodium	16035.60		19161.00	В	19.5	E	<u>P</u>
Strontium	186.40		193.00		3.5		P_
Tin	30.00	Ū	150.00	፱			<u>P</u>
Vanadium_	13.90	UB B	25.00	U B	100.0		
Zinc	1.30	B	33.50	$\overline{\mathbf{B}}$	****		P

JUS

Mol/15/91 Sodium esternolar

# U.S. EPA - CLP

# 14 ANALYSIS RUN LOG

ab	Name:	MARTIN_MAR	RIETTZ	LK25_SITE_	Contract:	HANFORI		
ab	Code:	K25ACD	Case	No.:	SAS No.:	<del></del>	SDG	No.:BOOFH5
nst	rument	ID Number	r: PE	5100	Method: F			_

tart Date: 06/19/91 End Date: 06/19/91

EPA				[									Ar	al	yt	es	3			_							$\top$
Sample	D/F	Time	% R	Ā	S	A	В	В	C	C	C	C	C	F	P	M	M	H	N	ĸ	S	Α	N	T	V	Z	c
No.	10/1	1 11110	0 10	L	В	s	A	E	Ď	A	R		ϋ	Ē	В		N	G	Î	•	E	G	A	Ĺ		N	
	1			"		١٦		-1	٦		^`	~		-	_	Ĭ	-`	٦	_		-	_					-
<u>50</u>	1.00	1347		-	_	-	-	-		-	-			-1	-	-	-	_	-	-	$\bar{\mathbf{x}}$		-	-	-	_	-
S5	1.00	1353			_	-		_	-	-1	-1	-		-	_		_	_	-	_	$\mathbf{x}$	_	_	_	_		
S100	1.00	1359		-	-	_	_	-			-1	-	-	_	-	_	_	_	-	_	х	_	_	_	-1		_
S200	1.00	1405		-	-	-	_	-	-	-1	_[	-	-[	_	_		_	_	-	-	x		-	-	-		_
ZZZZZZ	1.00	1411		-	_	-	_	-	_		_	-	-1	_			_	_	-	-			_				
ICV	1.00	1417		-		_	_							_			_	_			$\bar{\mathbf{x}}$					-1	$\Box$
⊤CB	1.00	1423																	_	<u> </u>	X						
LA_	1.00	1430									_									_	$\mathbf{x}$	_					
rBW	1.00	1436									_			_	_		_	_		_	X	l_	_	_	_	_	
PBWA	1.00	1443	86.0	_	_	_	_				_		_	_	_	_	_	_	_	_	X	_	_	_	_	_	_
LCSW	1.00	1449		_	_	_	_	_	_	_	<u>-</u>	_	_	_	_	_			_	<b> </b>	X	_			_	<b> </b>	-1
LCSWA	1.00	1456	91.0	-	_	_		  -	_	-	-	-	<b>-</b>		-	_	_	-	_		X	_	<b> </b> _	-	_	-	-1
BOOFH5	1.00	1502			<b> </b> _	_		_	_		-	_	_	_	_	_	_		_	<u> </u> _	X	-	_	_	-		
BOOFH5A_	1.00		107.0	_	_	-		_	_	-	-	-	_		_	_		_	<b> </b> _	_	X	_	_				-1
BOOFH5D_	1.00	1515		-	_		_	-		-		_	_	_	-	-	_	<b>-</b>	_		X	<b> </b> —	<b> </b> —		-		-
BOOFH5DA	1.00	1522	98.0		_	-	-		-	-	-	-	-	_	_	_		_	-	-	X	_	-	-	-	-	-
BOOFH6_	1.00	1529			_	-	-	-	_			-	-	-	_	_	-	<b>-</b>		-	X	_	<b> </b>	-	-		
CCV1	1.00		<del></del>	-	_	_	-	-	_	-		-		-	_	-	-	-	-	-	X	<b> </b>	<b> </b> –	-		-	
CCBI 400	1,00	1541	11 000	-	_	_	_		_	-	-		_	-	-	-	_	-	-		X	_	-	-	-	<b>-</b>	
BOOHF6S_	= <u>#6</u> A 1.00	1548 1554	2-20.92	<b> </b>	ر– ا		-	-	-	-	-	-	_	-	-	_	-	-	-		X	-	-	<b> </b> –	-	-	-1
BOORF65_	1.00	1601	2-20.92		/	<b> </b> —		-	_	-	-	-	_		-	_		-	_	-	X	-	-	<b> </b> –	-	-	
BOOF94A	1.00	1601	78.0		-	-		-	-	-	-		_	_	_			-	_	-	X	-	-	-		-	-1
ZZZZZZ	1.00	1614	10.1	<b> -</b>	-	-		-	-	-	-	-	_	_		-	-	-	_	-	^	-	-	-	-	<b>-</b>	-
BOOF95		1620			-	-	_		-	-	-	-	-	_	_	-	-	-	-	-	$\bar{\mathbf{x}}$	_		-		-1	-1
BOOF95A	1.00	1627	97.0	-	-	-	_	-	-	-	-	-		-	_	-	-	-	-	-	X	-	-	-		-	-
CCV2	1.00	1633			-		-	-		-	-		-		-		-	-	-	-	X	-	-	-	-	-	-1
CCB2	1.00	1639		-	-	<b> </b>		-	-	-	-	-	<b>-</b>	-	-	-	-	-	<b> </b> -	-	X	-	-	-	-	-	-1
ZZZZZZ	1.00	1645			-	-	-	-	_		-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-1
		+025			-	<b> </b> -	-	-	-	-	-		-	-	-		-	-	-	-	1-	-	-	-	-	-	_
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FORM XIV - IN

3/90

# U.S. EPA - CLP

#### 14 ANALYSIS RUN LÖG

ab Name:	MARTIN MARIETTA	K25 SITE	Contract:	HANFORD

ab Code: K25ACD Case No.: SAS No.: SDG No.:BOOFH5

Instrument ID Number: PE_5100____ Method: F_

Start Date: 06/20/91 End Date: 06/20/91

EPA	· · · · · · · · · · · · · · · · · · ·		<u> </u>	Γ_									Ar	al	-yt	es	3										T
Sample	D/F	Time	% R.	Ā	S	Α	В	В	C	С	С	C	С	F	P	М	M	Н	N	K	S	Α	N	Т	v	Z	ᄀ
No.	בי, ב	Time	9 1/-	L	В	s	A	E	D	A	R	0	ש	E	B	G	N	G	I	**	E	G	A	Ĺ	"	N	
				-	_		**		ا " ا			Ĭ	٦		_	١	-	٦			_	-		_			-
SO	1.00	1038		-	_	-	-	-	-	_		_	-	-	-		_			_	_		-	$\overline{\mathbf{x}}$	-	-	
S10	1.00	1044		_	_	-	_	-	_		-		-	-	_	_	_	-	_	_	_		-	X	_	_	_
S100		1050		-	_	-	_	_	-	_	_	_		_	_	_	_	_		_	_	-		X	-	_	-1
S200	1.00	1056		-	_	_	_	-	-	_	_	_	-		_	_	_	_	_	_	_	-	-	X	-	_	_
ZZZZZZ	1.00	1100		-		_			_	_	-	_		-1		_	_	-			_	_	-				<u> </u>
ICV	1.00	1108		_	_	_	_	_	_			_	_	_	_		_	_	_				_	$\overline{\mathbf{x}}$	_		
TCB	1.00	1114		]_	[_	_	_	_	_[		_	_	_	_	_	_	_	-	_			_	_	X			_
RA.	1.00	1120					_	_		_												_		X X			
CRAA	1.00	1126	92.5																	_	_	<u> </u>		X			$\equiv 1$
PBW	1.00	1132																						X	_		ΞΙ.
PBWA	1.00	1139	99.5	_		l		_		_	_	_		_	_	_	_		_	_	_	_	_	Х	_	_	_
LCSW	1.00	1145		_	_	_	_	_		_	<u> </u>	_	_	_	_	-	_	_	_	_	_	_	_	Х	_		_
LCSWA	1.00	1151	95.5	_	_	_	_		_	_	_	_	_	_	_		_	_	_	_	<b> </b> _	_	_	Х	_	_1	_[
BOOFH5	1.00	1157			_	_	_	_	_	_	_	_	_	_	_	_		_	_	_	l_	<b> </b> _	_	X	_	_	_
BOOFH5A_	1.00	1204	84.5		l_	_	_		_	_	_	_			_	_			-	_	<b> </b> _	<b> </b> _	_	X	_	_	_
BOOFH5D_	1.00	1210		<b> </b>	_	_	_	_	_	_	_	_	_	_		_		_	_	_	<b> </b> _	_	_	X	_	_	_
BOOFH5DA	1.00	1216	76.0	_	_	_	_	_	_	_	_	_	_	_	_	_		_	-	_	<b> </b> _	_	_	X	_	_	_
CCV1	1.00	1222			_	_	_	_	_	_	_	_	_	_	_	_		_	_	_	_	_	_	X		_	_
CCB1	1.00	1228		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	X	_	_	-1
BOOFH6	1.00	1234		$\Rightarrow$	۱	_\	<b>-</b>	-		_	-	!	-	_	_	_	-	_	_	_	<b> </b> _	<b> </b> _	-	X	-		<b>-</b> }
BOOFH6A_	1.00	1240	76.0	12	-		-	_	_	_	_	_	_	_	-	_	_	_	1		<b> </b> _	_		X	_		-1
BOOHF6S_	1.00	1246		_	_	_	_	_		_	_	_	_	_	+	_	_	_	-	_	_	<b> </b> _		x	_	_	_
BOOF94	1.00	1252		<b> </b>	_	<b> </b> _	_	_			_		-	_	_	-	_	_		_		-		x	_		-1
BOOF94A	1.00	1258	105.0	_	<b> </b>	-		_	-	_	_		_	_	_	_	_	_		_	_	<b> </b> _	_	Х	_	_	_
BOOF95	1.00	1304	87.5	<b>—</b>	-	-	_	-			-	_	-	_	_	_	_	_	_	_	<b> </b> —	_	-	X	_	-1	-
BOOF95A_	1.00	1311	87.5	-	-	_	_	-	-		-	-	-	-		-		_	_	_	<b> </b>	_	_	X X	-	-	-1
CCV2	1.00	1317		_	<b> </b>	<b> </b>	_	_	_	_	_	_	-	-	_	-		_	_	_	_	_	_	X	-	_[	-
CCB2	1.00	1323		<b> </b> _	<b> </b> —	<b> </b>	-	_			-	-	_	_	-	_	_	_	-			<b> </b>	_	X			
				-	-	-	_		-	_		_		_		-		_	_		<b> </b> -	-	-		-	-	-
					<b> </b> –	-	-		-	-		-	-	_	<b> </b>	-	_	-	-	-	<b> </b> -	<b> </b> -	-	-	-	-	
	<del></del>		·	-	-	-	-	-			_	-	-	-	<b> </b>	-		-			_	<b> </b>	<b> </b> —	<b> </b> —	-	-	-
<del></del>				-	<b> </b>	-	-	-	-	-	-	-	_	-			_	_	<b> -</b>	-	-	-	-			-	-
		l	l <del></del>	ı —	<b>'</b> —	l	<b>-</b>	<b>-</b>		_	_			<u> </u>	l		_	<b>!</b> !	<b></b>	l	۱	۱	l	l	<b>I</b> — l		—i

#### WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200 BP/	REVIEWER: Mek	DATE	: 8//	5/92
LABORATORY: K25	CASE:	SDG:	rson	1715
SAMPLES/MATRIX: 1307 F	45   18001	=94	<u> </u>	
				•
		····		
			<del></del>	
1. DATA PACKAGE COMPLETENESS	•			
Review the data package for completeness and clelements are missing contact the laboratory for s			a reviev	v
Data Package Item	Present?:	Yes	No	N/A
Case Narrative		4		_
Cover Page		رکسہ		
Traffic Reports/Chain-of-Custody		<u> </u>		
Sample Analysis Data Report Forms		ركند		
Standards Data		<u> </u>		
QC Summary				
Blanks Summary Report Forms				
Spike Sample Recovery Report Forms	÷	ر <u>سن</u> .		
Duplicate Sample Analysis Report Forms		<u> </u>	·	
Laboratory Control Sample Report Form	ıs	1		
Raw Data		_		
Ion Chromatograph Chromatograms		<u> </u>		
TOC and TOX Instrument Printouts		<u></u>		
Laboratory Bench Sheets		<u> </u>		
Additional Data		_	,	
Laboratory Sample Preparation Logs		<u> </u>		
Instrument Run Logs		<u>سي</u>		<i>_</i>
Internal Laboratory Chain-of-Custory			<u>_</u>	
Percent Solids Analysis Records				<u>/////////////////////////////////////</u>
Reduction Formulae				1
Chemist Notebook Pages			. —	
2. HOLDING TIMES				
THE THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON O				٠.

Action: If any holding times were exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

N/A

Were all samples analyzed within holding times?

#### 3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used?

Yes N

No N/A

Are the correlation coefficients  $\geq 0.995$ ?

Yes

o N/A

Was a balance check conducted prior to the TDS analysis? Contro

Yes 🤇

N/A

Was the titrant normality checked?

Yes

N/A

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

#### 4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency?

Yes

No

Are ICV and CCV percent recoveries within control?

Yes

No)

N/A

N/A

Are there calculation errors?

Yes

No_

N/A

ACTION: Qualify all affected data in accordance with the validation requirements.

#### LABORATORY BLANKS

Are target analytes present in the laboratory blanks?

Yes N

N/A

ACTION: Qualify all associated sample results for any analyte < 5 times the amount in any laboratory blank as nondetected (U) and list the affected samples and analytes below.

#### 6. FIELD BLANKS

Are target analytes present in the field blanks?

Yes

No



ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

#### 7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits?

Yes

Io N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are > CRQL, qualify the data as estimated (J). If the spike recovery is < 30% and the sample results are less then the IDL qualify the data as unusable (R).

# 8. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits?	Yes No N/A
Are there calculation errors?	Yes No N/A
ACTION: Qualify the affected results according to the following requirem	ents:
AQUEOUS LCS - Qualify as estimated (J), all sample results > IDL, for within the range $50-79\%$ or > $120\%$ . Qualify as estimated (UJ), all sample the LCS falls within the range of $50-79\%$ . Qualify as unusable (R) all sample LCS $\%$ R < $50\%$ .	e results < IDL, for which
SOLID LCS - Qualify as estimated (I), all sample results > IDL for which established control limits. Qualify as estimated (UI), all sample results < are lower than the established control limits.	
9. PERFORMANCE AUDIT ANALYSES	
Are the performance audit sample results within the acceptance limits?	Yes No N/A
ACTION: Note the results of the performance audit samples in the validat	ion narrative.
10. DUPLICATE SAMPLE ANALYSIS	_
Are RPD values within the acceptance limits?	Yes No N/A
Action: Qualify the results for all associated samples of the same matrix a falls outside the acceptance limits.	s estimated (J) if the RPD
11. FIELD DUPLICATE SAMPLES	
Do RPD values exceed the acceptance limits?	Yes No N/A
ACTION: Note the results of the field duplicate samples in the validation	narrative.
12. FIELD SPLIT SAMPLES	
Do RPD values exceed the acceptance limits?	Yes No NA

ACTION: Note the results of the field split samples in the validation narrative.

### 13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?

Yes

No

Are instrument detection limits below the CRDL?

Yes No

N/A

N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

#### 14. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?

Yes

No

Were project specific data quality objectives met for this analysis?

Yes

No

N/A

N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

SDG: 522FHS	REVIEWER:	KINV	7	DATE: S/	15/42		PAGE / OF 2
COMMENTS:	me	+ Chec	e '				
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DAȚE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
BODFHS	Alk.	3/27/11		4/8/91		12	none
	Acum.			4/10/41		14	1
	COD			4/8/91		12	
	CO			4/19/91		23	V
	90			4/5/91		9	5/45
	705			4/8/91		12	
	1			5/3/91	/	37	
	NOZ			4/19/91		23	
حارب مرسان ورسانا وروسانا	NOZ		/	4/19/91		23	1
	304			4/19/91	/	23	- Inne
····	TOC			4/13/9/		17	nne
	TOX			5/4/9/		40	1/45
	NTU		1	4/8/91		12	
	PH-Lab		1	4/8/91		12	V
,	-						

Σ

# **HOLDING TIME SUMMARY - FORM B-1**

SDG: KOUFAS REVIEWER: KING DATE: 8/15/62 PAGE ZOF_Z													
COMMENTS:	ne	+ Chen	r ·										
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER						
1300 F94	AlK.	4/3/4/		4/9/41		- le	nou						
	Acum.			4/10/41	/	7	1						
	100			4/10/91		7							
	CO			4/19/91		16							
	90			4/9/91		6	7/45						
	T05			4/10/91		7	nove						
	F	·		5/22/41	,	49	TIUT						
	NOZ		65	4/10/41		7	JUI						
	NOZ			4/19/91		16	JUIT						
	504	·		4/19/9/		16	une						
	TOC			4/13/91		10	6						
	TOX		•	5/21/91		48	T/UT						
	NTU			4/9/91		6	/						
	PH-Lab	·V		4/9/9/	+	6	1/						
	. 1			7									
,	-												

# 4-2-1 INITIAL CALIBRATION VERIFICATION WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse ab Name: Analytical Chemistry Department Contract: Hanford Company

)G#: ___BOOFH5____

	T	-				<del>-</del>
Analyte	Units	Batch No.	Initial	l Calibra	ation	
			True	Found	&R	,
Alkalinity	_Mg/1	91-13_	200	208	104%	
Ammonia	_Mg/l	91-09	0.5	0.5	100%	
_Bromide	N/A					
Chemical O2 Demand	Mg/l	91-18	60	61	101.7%	
Chloride IC	Mg/l	91-42IA	4.0	3.966	9.9.15%	
Conductivity	umho/cm	91-14	2876	2860	99.4%	
Dissolved Solids	_Mg/l	91-23	500	512	102.4%	
Fluoride SIE	Mg/L	91-30	2.0	2.0	100%	
	Mg/L	91-42IA	5.0	4.955	99.1%	
Nitrate Nitrogen	N/A				-	
Nitrite	Mg/L	91-42IA	2.0	2.01	100.5%	
Nitrite Nitrogen	N/A			<del>-</del>		
_Ortho Phosphate						
Sulfate	Mg/L	91-42IA	50.0	50.159	100%	
Total Organic Carbon	Mg/l	91-26D	5.0	5.131	102 68	-1-
Total Organic Halides	_ug/1	_91-21I	100	74.1	74.1%	DIMI
_Turbidity	บינע	_91-22	9.0	9.1	101.1%	'
pH		_91-39	7.0	7.01_	100.1%	
			]		<u> </u>	
				]		

MAS /15/he

mments:		

#### 4-3-1 BLANKS WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse
Lab Name: Analytical Chemistry Department Contract: Hanford Company

3DG#: ____BOOFH5____

Analyte	Batch No.	Initial Calibration Blank	Units
Alkalinity	91-13		
Ammonia	91-08		<u> </u>
Bromide	N/A		
Chemical O2 Demand	91-18		ļ
Chloride IC	91-42IA	<1	Mg/L_
Conductivity	N/A		
Dissolved Solids	91-23		
Fluoride SIE	91-30	<0.1	Mg/L
Nitrate	91-42IA	<1<	_Mg/l
Nitrate Nitrogen	N/A		<u> </u>
Nitrite	91-42IA	<1	Mg/L_
Nitrite Nitrogen	N/A		
Ortho Phosphate	N/A		<u> </u>
Sulfate	91-42IA	<1	Mg/L_
Total Organic Carbon	91-26D	<1	_Mg/l_
Total Organic Halides_	91-211	1.06	_ug/1
Turbidity	91-22		
pH	N/A		
***************************************		<u> </u>	

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mments:	as fl < 5×
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# 4-3-2 BLANKS . WET CHEMISTRY

Oak Ridge K-25 Site Westinghouse
Lab Name: Analytical Chemistry Department Contract: Hanford Company

SDG#: ___BOOFH5_____

Analyte	Batch No.	Initial Calibration Blank	Units
Alkalinity	91-14		
Ammonia	N/A		\
Bromide	N/A		1i
Chemical 02 Demand	91-19		
Chloride IC	91-45IA	<1<	Mg/L_
Conductivity	N/A		
Dissolved Solids	91-23		
Fluoride SIE	91-35	<.1	Mg/L_
Nitrate	91-45IA	<1	Mg/L
Nitrate Nitrogen	N/A		[
Nitrite	91-45IA		
Nitrite Nitrogen	N/A		
Ortho Phosphate	N/A		- <del></del>
Sulfate	91-45IA	<1	_Mg/L
Total Organic Carbon	91-26D	1.69	_Mg/1
Total Organic Halides_ _Turbidity	91-21I 91-22	1.69	_ug/l NTU
pH	N/A		
	N/A		
	<u> </u>		<del></del>
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mments:	Avolety opts 25%.
	no Great requied

# APPENDIX B

# DATA VALIDATION DOCUMENTATION

SDG: B00FH5

R	RADIOCHEMISTRY DATA VA	LIDATION CHECKL	IST March	in-Marietta
Data Package ID:	BOOFH5	Labora		-25
Data Validator:	T. Staps	Date:_	Jan. 18	3,1993
Analysis/Sample Ider	ntification/Matrix:			· \
Alpha Beta	BOOFH5	WATER 2	99-E33	<u>s-05</u> (Split
Cs-137, Oc-60	1 ms/msd		, 1	
Fa-238/239 U	/ BOOF 94	/ 29	9-E33-	07 (Split)
Sr-90, Tc-99, Ra-	" MS/MCD "		10	· · · · · · · · · · · · · · · · · · ·
十名 1. Completeness	i			
: *	hecklist (Complete the approp	riate checklist for each	h analysis ty	pe and
2. Calibration				
2.1 Initial Calibration	n		~	
Was instrument calib	brated within specified time pe	eriod or annually? (Y/	N/NA)_ <u>C</u> C	mment ()
	sociated data as unusable (R).			)
Was each detector u	sed for the associated data cal	ibrated? (Y/N/NA)	<del></del>	
If NO, qualify all ass	sociated data as unusable (R).	^		)
Are calibration stand	lards NIST traceable or equiva	lent? (Y/N/NA)		
If NO, qualify all ass	sociated data as unusable (R).			{
Were calibration star	ndards expired? (Y/N/NA)			
If YES, qualify all as	sociated data as unusable (R).			
Comments/Qualified	Results:	<u> </u>		· · · · · · · · · · · · · · · · · · ·
2011		- 5	<u> </u>	72
U) Collibration	Detector identif	.( ) (	<u>ana a ro</u>	- Good E
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Lezuit Die	e rejected unti	il data is m	age ave	illable.
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22 Continuing Campianion
Is check source identified by activity and radionuclides? (Y/N/NA) COMMENT ()
If NO, qualify all associated data as estimated (1).
Has check source been counted daily? (Y/N/NA)
If NO, qualify all associated data as unusable (R).
Are check source counts within ±3S control limits? (Y/N/NA)
If NO, qualify all associated data as unusable (R).
Have background counts been performed at least weekly and before and after all field and
QC samples associated with the SDG? (Y/N/NA)
If NO, qualify all associated results as unusable (R).
Are background counts within ±3S control limits? (Y/N/NA)
If NO, qualify all associated results as unusable (R).
Comments/Qualified Results:  [] Check Source and background count data is
nct available.
<u> </u>

3.	Blanks	•			$\wedge$		· 🔿
Ha	ve reagent/method	Vfield blanks be	en analyzed	with the SDG?	(Y/N/NA)_	COMMEN	<u>t</u> (U)
If N	NO, qualify all resu	ılts >LLD as est	timated (J).				
Are	positive results re	eported in the re	eagent/meth	od/field blanks?	(ANVAYA)		_
	ES, qualify positiv					sample results	;
<1	0X the blank value	but greater tha	n the MDA	as estimated (j)			
Ca	n blank results be	verified/calculat	ed properly	? (Y/Y)NA):		,	
Co	mments/Notes/Qu	alified Results:_	· · · · · · · · · · · · · · · · · · ·			<del> </del>	
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<u>)</u>	The following	no nuclic		19 NO ME		3 lack bl	<u>Su</u> rk
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	4. Detection Limits and Sample Results	0	
•	Can LLDs and MDAs be verified? (YNA)_	COMMENT ()	,
	If NO, qualify all results as estimated detects	(J) or estimated nondetects	(UJ).
	Do reported results meet the detection limit re	equirements? (Y/N/NA)C	<u>'cmment(2)</u>
	Note discrepancies in the validation report na	irrative under representati	veness.
	Can reported results be verified? (Y/N/NA)	comment(1)	
	If NO, note missing data in the validation rep	ort. Correct results on the	e photocopied report
	forms and include in the validation report.	•	
	Comments/Notes/Qualified Results:		
	OFM DA'S , LLD'S cannot b	be verified at -	this time.
	grs «		
	grs B		
	BCOHF5	B00 F94	
	TC 99		;
	5000		
	H-3		,
	Du 538 X	X	
	Pu ^{23 9} X		
	R2-226 X	X	
3	GAMMA		
	(°S-137		;
	Cc-60		<u> </u>
			_
. (	3) Sample resultsabor	e marked wit	Lan"x" have
<u>、</u> シ	- Menny lucor Zero Teno	nted results.	The rest are
new.	t. not verifiable for d	etection limit i	requirêments
ne ^{ki}	Since MDA's are not r	eported.	
2			
3			
		-	

5. Radiom	ietric and	Gravimetric 1	ieias		•
Werespik	es/tracers	chemical yield:	s analyzed i	n each SDG and	l/or sample as appropriate for
the analyt	ical meth	_(AN(Y)Y) Sboi	CTWIN	neut-O	
If NO or i	f inappro	priate tracers v	vere used qu	alify associated	results as unusable (R).
Was a field	d blank ı	ised for the spil	ke/tracer/che	emical yield anal	lysis? (YNA)
		validation narra			
Is spike/tra	acer/chen	nical yield recov	very within t	the limits of 30-1	105% for sample results <4X the
spike activ	<b>A</b>	-			<u>-</u>
	G		alify associa	ted results as fo	ollows:
%R:	_	% 30-105%	>105%	>115%	*
			·- ·-		
<lld< td=""><td>R</td><td>acceptable</td><td>UJ</td><td>R</td><td></td></lld<>	R	acceptable	UJ	R	
>LLD	R	acceptable	J	R	
Comments	s/Notes/Ç	Qualified Result	s:		
(1 C) 10	mical	vields o	and for	scar roun	veries information
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6. Duplicate Samples and Analyses	
Has at least one duplicate analysis been performed for every	
10 samples in the SDG? (YNNA) COMMENT ()	-
If NO, qualify all associated results as estimated (J).	-
Has the field blank been used for duplicate or MS/MSD analysis? (Y/V)NA)	
Are RPD valus ≤35% for results >5X the LLD and within ±2X the LLD for result	ts <5X the
LLD? (Y/N/NA) COMMENT (2)	
If NO, qualify associated results <lld (uj)="" all="" and="" as="" associated<="" estimated="" nondetects="" th=""><th>ciated results</th></lld>	ciated results
>LLD as estimated detects (J).	
Comments/Notes/Qualified Results:	
District and Carlo	S-137, Cc-6
	5-137, CC-61
Ka-226 and tritim.	
POD INTERNATIONAL PROPERTY OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF THE POPULATION OF	0.2450 0 0
KPP values are above the 35% limit for	- 1
with Sample 200 F94 and Sr-90 for som	VDIE RIVEH
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	<i>:</i>

Are LCS results w	rithin the c	ontrol limi	its of 80-11	20% (Y/k	JAIA):	Data	Below	
If NO, qualify res	ults as follo	ows:		عر» ر. _ا ر	<i>y,</i>	· · · · · · · · · · · · · · · · · · ·		
%R:		50- <b>7</b> 9%	>12	<u>0%</u> -				
Results < LLD: Results > LLD:	R R	UJ J	R R	٨				
Has at least one L	.CS been a	nalyzed w	ith the SE	XC3 (X)V	I/NA):			
If NO, qualify all			estimated	<b>(</b> )-				
Comments/Notes/	Qualified l		·			1: C.		—
· · · · · · · · · · · · · · · · · · ·	1710	<u>-1 n</u>	stru. I	<u>()</u>	(2/110	alitier_	Pa = 10	<u>-</u>
Gre x	71%		<del></del>	<del></del>		<u> </u>	V8 2-10	<u>4</u> :
<u> </u>	1360					R	<u> </u>	
<u>CS-137</u>	99 cz		<del>&gt;etent</del> c	<u>r (                                   </u>		lor"		
<u>(1.5137</u>	98%	<del>.</del>	11				<del> </del>	
Pu-238	95%	<del></del>			<del></del>	V		
Pu-239	933°					ν Ο		
<u>Ra-226</u>	148.5		· · · · · · · · · · · · · · · · · · ·		!	<u>2</u>		
<u>Sr-96</u>	124 %	· · · · · ·				R		
H-3	99%		* * *					
Total Il	97%		· · · · · · · · · · · · · · · · · · ·		<del></del>	<u> </u>		
16-010	1069	<u> </u>				<i>V</i>	<u> </u>	
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## 8. Holding Times

Have all samples/a	nalyses been comple	eted within 5 half-lives or	180 days, whichev	er comes
first? (Y/N/NA):	Data Below	۸		<u> </u>
If NO, qualify all a	ssociated results >L	LD as estimated detects (	J) and all associate	d results
<lld as="" estimated<="" td=""><td>l non-detects (UJ). I</td><td>For gross exceedances (&gt;</td><td>2X criteria) qualify</td><td>all</td></lld>	l non-detects (UJ). I	For gross exceedances (>	2X criteria) qualify	all
associated results a	is unusable (R).			
Comments/Notes/(				
	800F45	Avalysis	y lay S	Qualit.
GNE X	3-27-91	5-23-91	58	
		5-23	58	
TC-99		5-15 √	50	
Sr-90		2-5-92	315	R Tus
G2-133		5-30-91	65	
Co-160		5-31	66	- V>19
Tot. U		5-30	65	
Ra-226		4-18	23	<u></u>
H-3		5-3	38	·
Pu-238/239		5-29 4	64	
	800F94			
978 ×	4-3-91	5-23-91	50	<u> </u>
05-137		5-31	58	
Co-60	4	5-31	58	
gus B		5-23	50	
10-99		5-15 √ .	42	·
Sr-90		2-5-92	<i>3</i> 07	R Tus
Tot.U		5-30-91	57	(FC ,g
Re-226	(	4-18	15	- Inli
H-3	<del></del>	5-3	30	<del></del>
Pu 238/239		5-294	56	
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	9.1 Gas Proportional Counters
	Are field and QC sample preparations outside the range of the self absorption curves?
	(YNNA): Comment ()
	If YES, qualify all associated data as estimated (J).
	Are initial detector efficiencies <20%? (Y/N/NA):
	If YES, qualify all associated data as unusable (R).
	Have statistical tests been performed routinely (at least weekly)? (Y/N/NA):
	If NO, qualify all associated data as estimated (J).
	Have stability verifications been performed after each gas change? (Y/N/NA):
	If NO, qualify all associated data as estimated (J).
	Comments/Notes/Qualified Results:
<u>D</u>	Gas proportional GC parameters are not available
	•
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9. Method Specific and Other Quality Control

** Aiplia Specificacopy
Has detector system been calibrated across the energy range of interest? (Y/N/NA): COWWNELT+
If NO, qualify all results as unusable (R).
Is detector resolution adequate to identify each peak centroid? (Y/N/NA):
If NO or if resolution cannot be determined, qualify all results as unusable (R).
Is resolution at least 20 keV FWHM? (Y/N/NA):
If NO, qualify all results as estimated (j).
Do check source efficiencies agree within 5% of initial calibration efficiencies or are they
within the control limits or ±3S of the mean? (Y/N/NA):
If NO, qualify all associated results as unusable (R).
Was each sample spiked with a tracer? (Y/N/NA):
If NO, qualify all associated results as unusable (R).
Are tracer recoveries within the control limits of 30 to 105%? (Y/N/NA):
If NO, qualify all results as follows:
<u>%R: &lt;30% 30-105% &gt;105% &gt;115%</u>
Results < LLD: R acceptable UJ R Results > LLD: R acceptable J R
Comments/Notes/Qualified Results:
C. Alpha Spect. QC parameters were not provided and veri fication Cannot be done.

	9.3 Gamma Spectroscopy
	Does efficiency calibration approximate a smooth semi-log curve? (Y/N/NA):
	If NO, qualify all results as unusable (R).
	Have geometry or matrix factors been accounted for in all analyses? (Y/N/NA):
	If NO, qualify all associated results as unusable (R).
	Does the detector calibration cover the energy range of interest and at least
	0 to 2 MeV? (Y/N/NA):
	If NO, qualify all results outside the energy range as unusable (R).
	Is resolution of the detector system adequate and less than 5 FWHM? (Y/N/NA):
	If NO, qualify all results as estimated (J).
	Comments/Notes/Qualified Results:
<i>~</i> ~	
1	) Camma Speat. GC parameters not provided and
	veritination is not possible.
	t .
	$\vec{r}$

9.4 Alpha Emitting Radium Isotopes
Have single radium isotopes (Ra-223, Ra-224, Ra-226) been reported? (Y)N/NA):
If YES, qualify all results attributed to a single radium isotope as estimated (J) if the
contribution to the total from individual isotopes is unknown.
Can time from sample precipitation to counting be verified? (YNNA): Kaw dota not available
If NO, qualify all associated results >MDA as estimated (j).
Have barium interferences been identified and accounted for? (Y/N/NA):
If NO, qualify all associated results with elevated barium levels as estimated (I).
Has counting efficiency for Ra-226 been determined for each SDG? (Y/N/NA):
If NO, qualify all associated results as unusable (R).
Have blanks been analyzed with each group to check for possible radium contamination in
the reagents? (Y/NA): SEE DOGE 3
If NO, qualify all associated results as estimated (I).
Are LCS recoveries with the control limits listed below? (YNA): See Page 7.
If no, qualify sample results as follows:
<u>%R: &lt;50% 50-69% 70-130% &gt;130%</u>
Results < MDA R UJ Acceptable R Results > MDA R J Acceptable R
If sample was preserved at collection has analysis been completed within 180 days or 5 half-
lives? (YNNA): Sample preserved HNUZ & Sampling (Re: Cotc.).
If NO, qualify results > LLD as estimated detects (I) and results < LLD as estimated non-
detects (UJ).
If samples were not preserved, were samples received within 5 days of
sampling? (Y/N/NA):
<ul> <li>Were samples preserved at the laboratory upon receipt? (Y/N/NA):</li> </ul>
Were samples held after preservation for at least 16 days? (Y/N/NA):
If NO, to any of the above, qualify associated sample results as estimated (J).
Comments/Notes/Qualified Results:

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`	7.5 Radium 226 Analysis using Scintiliation (Lucas) Cell Counting
3	s calibration data present and can it be associated with the samples? (YNA):
	if NO, qualify associated sample results as unusable (R).
1	Was the counting system calibrated each day that samples were analyzed? (Y/N/NA):
	If NO, qualify associated results as estimated (J).
. 1	Was the counting system calibrated after replacing the scintillation cell? (Y/N/NA):
	If NO, qualify associated results as estimated (1) if the cell has a previously determined
	calibration constant and unusable (R) if no constant is available for the replacement cell.
7	Were blanks analyzed with each sample group to check for radium contamination
j	in reagents? (YNNA):
1	If NO, qualify associated results as estimated (J).
]	If sample was preserved at collection has analysis been completed within 180 days or 5 half-
1	lives? (Y/N/NA): COYNWEIN+ (1)
	If NO, qualify results >LLD as estimated detects (J) and results < LLD as estimated non-
	detects (UJ).
	If samples were not preserved, were samples received within 5 days of
	sampling? (Y/N/NA):
	Were samples preserved at the laboratory upon receipt? (Y/N/NA):
	Were samples held after preservation for at least 16 days? (Y/N/NA):
	If NO, to any of the above, qualify associated sample results as estimated (J).
	Comments/Notes/Qualified Results:
F.V.	
CU,	Unable to determine methodology used.
	<b>J</b> .
	· · · · · · · · · · · · · · · · · · ·

	9.6 Tritium Analysis by Liquid Scintillation Counting
	Do calibration standard matrices match the sample matrices? (Y/N/NA): Cayvin Pi-fi
	If NO, qualify associated results as estimated (J).
	Has at least one calibration standard been processed with the samples (Y/N/NA):
	If NO, qualify results associated with runs lacking calibration standards as unusable (R).
	Have results for counting efficiency determination been provided? (Y/N/NA);
	If NO, qualify all associated results as unusable (R).
	Do tritium levels in the blanks exceed the MDA? (Y/N/NA):
	If YES, qualify associated results less than 10X the background tritium level (blanks) as
	estimated (J).
	Have blanks been analyzed with each sample run to check for potential contamination in the
	chemical reagents? (Y)N/NA):
	If NO, qualify associated results as estimated (J).
	Comments/Notes/Qualified Results:
_	
1,	GC parameters for Tritium analysis were not
	provided - Unable to verity at this time.
	·

	7.7 Fluorometric Analysis of Grandum
	Has the laboratory provided evidence that cation and anion interferences are negligible for
	the matrix or that matrix interferences have been accounted for? (Y/N/NA);
	If NO, qualify associated results as estimated (J).
	Has the laboratory provided a description of the method of fusion standardization or
	provided data supporting fusion standardization? (Y/N/NA):
	If NO, qualify associated results as estimated (J).
	Was calibration performed immediately prior to sample analysis? (Y/N/NA):
	If NO, qualify associated results as estimated (J).
	Comments/Notes/Qualified Results:
_	
Ì	Total uranium analysis method not determined
	QC parameters rannot be verified.
	<u> </u>

Mo Comments R 1-19-93	omments/Notes/Qualitied Result				
No Compa-15 & 1-19-93			/		
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# GAS PROPORTIONAL COUNTERS LOW BACKGROUND BETA COUNTERS

Data Package ID: ECOFH5
Analysis: $ars \times B$ , $Sr-90$ , $Tc-99$
A.0 Completeness Checklist  Analysis Results  X - No
Analysis Results × - No
Results Report for Sample Analyses and Reanalyses Raw Data (Counting Logs, Printouts, Notebook Pages) Calculation Sheets Sample Identifications Detector Identification Analysis Date and Initials of Analyst Amounts of Samples Prepared or Counted Weights of Solids Counted
Initial and Continuing Calibration
Detector Identification Calibration Date(s) and Initials of Analyst Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity Amount of Check Standard Used Raw Data including Counts and Count Duration for Standards Weights of Preparations Efficiencies Weights of Carriers Added, If Applicable Results of Statistical Tests Used to Evaluate Instrument Reliability and Efficiency Checks Raw Data of Background Counts and Count Duration Results of Statistical Test Used to Evaluate Instrument Background Control Limits fo Check Source and Background Counts
Detector Identification  Date of Analysis
X MDA of Method
Amounts of Reagents Used in Blank
Radiometric and Gravimetric Yields
Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used  Weights of Precipitates or Solids Counted  Calculated Recoveries

<u>Duplicates</u>				
Detector Identification  Date of Analysis  Aliquots of Samples  N/A  Weights of Solids Counted  Count Durations  Sample Identifications  Calculated Precision	-	:		
Laboratory Control Samples				
Detector Identification  Date of Analysis  Calculation of Recoveries  Results of Analyses				
Comments/Qualified Results:				<del></del>
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### ALPHA SPECTROSCOPY

Data Package ID: BOOFH5
Analysis: Pu-238/239
B.0 Completeness Checklist
Analysis Results  Analysis Results
Results Report for Sample Analyses and Reanalyses  Raw Data (Spectra, Printouts, Notebook Pages)  Calculation Sheets  Sample Identifications  Detector Identification  Analysis Date and Initials of Analyst  Amounts of Samples Counted (Precipitated or Deposited)
Initial and Contining Calibration
<ul> <li>Detector Identification</li> <li>Calibration Date(s) and Initials of Analyst</li> <li>Identification of Calibration and Check Standards including Radionuclide,</li></ul>
<u>Blanks</u>
Detector Identification  Date of Analysis  MDA of Method  Amounts of Reagents Used in Blank
<u>Duplicates</u>
Detector Identification  Date of Analysis  Amounts of Samples Counted  Count Durations  Sample Identifications  Calculated Precision
Radiometric and Gravimetric Yields
Amounts (Volumes, Concentrations, Activity) or Spikes, Tracers, or Carriers Used  NIST Traceability of Spikes, Tracers or Carriers  Weights of Precipitates or Solids Counted  Calculated Recoveries

Laboratory Control Samples				
Detector Identification Date of Analysis Calculation of Recoveries Results of Analyses		-		
Comments/Qualified Results:				
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## GAMMA SPECTROSCOPY

Data Package ID:	500F45		···
C.0 Completeness	Checklist		V-Yes
Analysis Results		•	V-Yes x-No
Raw Data (S  Calculation Sample Ider  Detector Ider  Analysis Da		Channel, Notebook Pag	NA-Not. es) Applicable
Initial and Continu	ing Calibration		
Identification Certification Amount of Raw Data in Efficiencies	Date(s) and Initials of Analyst n of Calibration and Check Stand , Expiration Date, and Activity Check) Standard Used Icluding Counts and Count Dura and/or Geometry and Matrix Fact f Background Counts, Count Dat	tion for Standards	
<u>Blanks</u>			
Detector Ide Date of Ana MDA of Me Amounts of Raw Data	lysis	i.	
<u>Duplicates</u>			-
Detector Ide	lysis Samples tions		- •
Radiometric and G	ravimetric Yields		
	olumes, Concentrations, Activity) Precipitates or Solids Counted Recoveries	of Spikes, Tracers or (	Carriers Used

		i l	esults:		Λ	difion				
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# ALPHA EMITTING RADIUM ISOTOPES USING SCINTILLATION COUNTING

Data Package l	D: BOOFH5
D.0 Completes	ness Checklist
Analysis Resul	<u>ts</u>
Raw Da	tion Sheets Identifications I Identification and Counting Precision Solution and Analyst Initials
Initial and Cor	ntinuing Instrument Calibration
Calibratical Identification    Expiration   Amount   Raw Date   Duration    Calibration   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   Identification   I	or Identification tion Dates and Analyst Initials cation of Calibration Standards including Radionuclides, Certification, Issue or tion Date and Activity t of Standard Used for Calibration tata (Gross Counts, Count Duration, Background Count, and Background Count on) e Control Charts
<u>Blanks</u>	
Date of MDA o Amoun Lot Nu	f Method ts of Reagents Used mbers of Reagents Used ata (Gross Counts, Count Duration, Background Count, and Background Count
<u>Duplicates</u>	
Date of Sample Amoun Raw Date	or Identification  Analysis  Weight  It of Spike for Spiked Duplicates  At (Gross Counts, Count Duration, Background Counts, and Background  Duration)

Radiometric and Gravimetric Yields
Amount of Spike Used for Spiked Samples Amount of Radium Standard Used for Radiometric Yield Determination NIST Certification for Radium Standards Calculated Radiometric Yield Weight of Carrier Added for Gravimetric Determination Weight of Carrier Recovered for Gravimetric Determination Calculated Gravimetric Yields
Laboratory Control Samples
Sample Identification Detector Identification Date of Analysis Calculated Recoveries Results of Analyses Sample Weight
Comments/Qualified Results:

# RADIUM-226 ANALYSIS USING SCINTILLATION (LUCAS) CELL COUNTING

Data Package ID:BOOFHS
E.0 Completeness Checklist
Analysis Results
Results Reports for Sample Analyses and Reanalyses Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration) Calculation Sheets Sample Identifications Scintillation (Lucas) Cell Identification Analysis Date and Analyst Initials Amounts of Samples Counted Sample Weight or Volume
Initial and Continuing Instrument Calibration
Scintillation (Lucas) Cell Identification Calibration Dates and Analyst Initials Identification of Calibration Standards Including Radionuclides, Certification, Issue or Expiration Date and Activity Amount of Standard Used for Calibration Rad Data (Gross Counts, Count Duration, Background Count, and Background Count Duration Routine Control Charts
Blanks
Scintillation (Lucas) Cell Identification  Date of Analysis  MDA of Method  Amounts of Reagents Used  Lot Numbers of Reagents Used  Raw Data (Gross Counts, Count Duration, Background Counts, and Background Count Duration)
<u>Duplicates</u>
Scintillation (Lucas) Cell Identification  Date of Analysis  Sample Weight  Amount of Spike for Spiked Duplicates  Raw Data (Gross Counts, Count Duration, Background Counts, and Background

Radiometric and Gravimetric Yields
Amount of Spike Used for Spiked Samples Weight of Carrier Added for Gravimetric Determination Weight of Carrier Recovered for Gravimetric Determination Calculated Gravimetric Yields
Laboratory Control Samples
Sample Identification Scintillation (Lucas) Cell Identification Date of Analysis Calculated Recoveries Results of Analyses
Comments/Qualified Results:
· · · · · · · · · · · · · · · · · · ·
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# TRITIUM ANALYSIS USING LIQUID SCINTILLATION COUNTING

Data Package ID:	BOOFHS.	<u> </u>
F.0 Completeness Checklist	_	V-Yes X-No
Analysis Results		X-No
Results Report for Sample Raw Data (Gross Counts, Duration) Calculation Sheets Sample Identifications Instrument Identification Analysis Date and Analys Sample Weight		N/n - Not Applie. Count, and Background Count
Initial and Continuing Instrumen	nt Calibration	
Expiration Date and Active X Raw Data (Gross Counts, Duration)	Count Duration, Background C	
<u>Blanks</u>		
Instrument Identification  Date of Analysis  MDA of Method  Amounts of Reagents Use  Lot Numbers of Reagents  Raw Data (Gross Counts,  Duration)  Tritium Levels in Backgro	Used Count Duration, Background C	Count, Background Count
<u>Duplicates</u> :		
Instrument Identification Date of Analysis Amounts of Samples Amount of Spike for Spik Raw Data (Gross Counts,	ed Duplicates Count Duration, Background C	Counts, and Background

## FLUOROMETRIC ANALYSIS OF URANIUM

Data Pac	:kage ID:	00H5	
G.0 Com	npleteness Checklist	·	V- Yes
Analysis	Results		$x - N_0$
X R X C X Ir A	desults Report for Sample Analyses and Law Data (Fluorometer Readings, No Calculation Sheets fample Identifications instrument Identification analysis Date and Analyst Initials fample Weight		N/A-Not applicable
<u>Initial an</u>	nd Continuing Instrument Calibration	1	
7	nstrument Identification Calibration Dates and Analyse Initials dentification of Calibration Standards Concentration Amount of Standards Used for Calibr Law Data (Fluorometer Readings, No	including Certification, Expiration	n Date and
Blanks			
D X M X A	nstrument Identification Date of Analysis MDA of Method Amounts of Reagents Used Lot Numbers of Reagents Used Law Data (Fluorometer Readings, No	tebook Pages, etc.)	-
<u>Duplicate</u>	<u>es</u>		-
× A	nstrument Identification Date of Analysis Amounts of Samples Amount of Spike for Spiked Duplicate Raw Data (Fluorometer Readings, No		
<u>Gravimet</u>	tric Yields		·
I W	Veight of Carrier Added for Gravime Veight of Carrier Recovered for Grav Calculated Gravimetric Yields		

	Laboratory Control Sample	<u>es</u>		
	Sample Identification	מו		
	Instrument Identific	ation		
	Date of Analysis		-	
- 02 /	Calculated Recovering Results of Analyses	ies		
M.M.	Results of Allaryses			
	Comments/Qualified Resul	ts:		
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		NO GOMMEN	ts to 1-19-93	
	,			

Date Printed:

23-MAR-1992 13:58

#### Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Analis ID: 910403-102

Project: G132 001C

Customer Sample ID: BOOFH5

Customer: KESSNER/BUTCHER

Date Sampled: 27-MAR-1991

- Requisition Number:

Date Sample Received: 31-MAR-1991

Sampled By:

Date Sample Completed: 19-MAR-1992

Material Description: WATER

Date Sample Approved:

Program Manager: N: AMRIBGEY (# 28012

[] : Result has been Corrected for Snike

	Program Manager: Di Al	BURGEY (# 28912	[] : Result has been Corrected for Spike				
rocedure No.	Analysis	Result Q Qual	Limit of Error	Units	Analyst	QA File Number	Date Completed
							· · · · · · · · · · · · · · · · · · · ·
**** Radioch	emistry Laboratory *****						
C-134	Cesium-137	2.44 RX	+/- 3.7	pCi/L	900028	ENV-523	7-JUN-1991
C-134	Cobalt-60	1.20E1 RX	+/- 3.6E0	pCi/L	DK HANN		
PA-900.0	Alpha Activity	2.30_12	+/- 1.4 丁	pCi/L	900028	ĒHV-523	23-HAY-1991
PA-900.0	Beta Activity	5.88E2 RAF	+/- 15.1	pCi/L	900028	ENV-523	23-HAY-1991
PA-903.0	Radium	037-19 RX	€+/37 P	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
PA-905.0	Tritium	4-1E3 1294	+/- 6.1E2_	pCi/L	DS VAUGHN	ENV-523	4-NAY-1991
PA-906.0	Strontium	0.44 tiple	+/- 0.8 8	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
HA-485	Uranium Alpha Activity	0.82 1	+/- 2.0	pCi/L	900028	ENV-523	30-HAY-1991
P-1628	Technetium-99	3.62E3-	+/- 1.6E3 K	pCi/L	900028	ENV-523	16-MAY-1991
P-1635	Plutonium	NA	+/-	pCi/L	900028	ENV-523	30-MAY-1991
P-1635	Plutonium-238	1.5 0.00 TUR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
P-1635	Plutonium-239	1.5 2.00 WR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
D (BNA- CLP	<b>&gt;</b>		۱ ،				
******	-	:47	1-19-93			-	
Ħ	= 7	×	ي ( ^س اهر عرب				
ate Extracted	* *** ** ***	,	`		2	1.	1
•	Extracted (mL) = 1000.0		1-X - 1	Poster As	law consider ted and en	detrouelles.	unter
xtraction Met	<b>p</b> : , .	unnel		in the	misseria de		
xtraction Sol	•	loride	· ·		and all		•1
xtraction Cle	•	te 🗸	IR - W	udeted	ted and co	uditimolli	
inal Volume o	f Extract (mL) = 1.0		201	أرة الروار أ	1. 1.	- />	<b>4</b>
ssociated Bla	nk = 910408-252		rug	een l	dre de mes	eng dal	<i>x</i> ,
				Must	- , .	ŧ	
rep (Pest- CL)	P)			1/2.5	1/93		

rep (Pest- CLP)

straction Method

đ

= 7

ate Extracted = 7-APR-1991

ample Volume Extracted (mL) = 1000.0

≤ Separatory Funnel

Atraction Solvent ■ Methylene Chloride

Straction Cleanup = Sodium Sulfate

inal Volume of Extract (mL) = 10.0

sociated Blank = 910408-150

#### Replicate Results of Analysis

	Replicate							
alysis	Results	Results	RPD					
**********								
Technetium-99	3.62E3	4.6E3	23.8					

#### pike Recovery Data

natysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
/ANIDE	0.017	0.10		mg/L	0.11	113.0
LUTONIUM-239		21306 21306		pCi/L pCi/L	18400. 18400.	86.4 <b>8</b> 6.4
OTAL ORGANIC CARBON (TOC) RANIUM ALPHA ACTIVITY	0 0.82	5 675		mg/L pCi/L	4. 647.	80.0 95.9

#### Oak Ridge K-25 Site Analytical Chemistry Department Results of Analyses

Date Printed: 23-MAR-1992 13:58

Analis ID: 910408-029

Project: G132 001C

Customer Sample ID: BOCF94

Customer: KESSNER/BUTCHER

Date Sampled:

3-APR-1991

Requisition Number:

5-APR-1991

Sampled By:

Date Sample Received:

Material Description: WATER

Date Sample Completed: 19-MAR-1992

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

ocedure No.	Analysis	Result <b>Q Qu</b> al	Limit of Error	Units	Analyst	QA File Number	Date Completed
		**				*******	
Kadioch	emistry Laboratory *****						
134	Cesium-137	0.93 RX	+/- 3.3	pCi/L	900028	ENV-523	7-JUN-1991
·-134	Cobalt-60	1.53E1 RX	+/- 3.5E0	pCi/l	DK MANN		
A-900.0	Alpha Activity	2.49	+/- 1.4 丁	pCi/L	900028	ENV-523	23-MAY-1991
A-900.0	Beta Activity	5.42E2 177	+/- 14.5	pCi/L	900028	ENV-523	23-MAY-1991
A-903.0	Radium	0.34 34 EUR	+/34 R	pCi/L	DS VAUGHN	ENV-523	4-MAY-1991
A-905.0	Tritium	4.2E3  ₹メ	+/- 6.2E2	pCi/L	DS VAUGHN	ENV-523	4-HAY-1991
A-906.0	Strontium	135	+/- 0.9	pCi/L	VS ARMSTRONG	ENV-523	6-FEB-1992
A-485	Uranium Alpha Activity	1-9 0.00 X HR	+/- 1.90	pCi/L	900028	ENV-523	30-MAY-1991
-1628	Technetium-99	3.53E3+ <del>2.4</del> −	+/- 1.6E3	pCi/L	900028	ENV-523	16-MAY-1991
-1635	Plutonium	NA	+/-	pCi/L	900028	ENV-523	30-MAY-1991
-1635	Plutonium-238	1.5 0.00 RUR	+/- 1.5	pCi/L	900028	ENV-523	30-MAY-1991
- 1635	Plutonium-239	0.87 RDG	+/- 1.2	pCi/L	900028	ENV-523	30-MAY-1991
			<b>k</b>		10 10		

(BNA- CLP) ------

= 11-APR-1991 te Extracted

mple Volume Extracted (mL) = 1000

traction Method = Separatory Funnel traction Solvent = Methylene Chloride

traction Cleanup = Sodium Sulfate

nal Volume of Extract (mL) = 1.0

sociated Blank = 910411-095

ep (Pest- CLP)

£ 6

te Extracted = 9-APR-1991

mple Volume Extracted (mL) = 1000

traction Method = Separatory Funnel

traction Solvent = Methylene Chloride

= Sodium Sulfate traction Cleanup

hal Volume of Extract (mL) = 10.0

sociated Blank = 910409-040

TE 1-19-43

RA - Avalité ditectel but conditionally répeted dire to virre data UR - Avalité undetected leut conditionally répeted ducho Missing data

Replicate	Results	of	Ana	l ys i	S
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·		Replicate			
Anatysis	Results	Results	RPD		
!ranium Alpha Activity	0.00	0	0.0		
·lutonium-238	0.00	0	0.0		

#### Spike Recovery Data

lysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** UnKnown Lab ****		******				
CYANIDE	0.038	0.1	0.147	mg/L	0.109	109.0
TECHNETIUM-99	3.53E3	12420	16600	pCi/L	13070.	105.2

# APPENDIX C DATA VALIDATION DOCUMENTATION

SDG: B00J75

## RADIOCHEMISTRY DATA VALIDATION CHECKLIST

Data Package ID: BOOT 75	A Laboratory: K-25
Data Validator:	200 Date: Jan. 18 1993
Analysis/Sample Identification/Matrix:	
Alpha Beta / BOOJ75A	/ SOIL/Near Juriage Dupli
(S-137 Ru-738/239 / BOOJ 76A	
Sr-90, Tc-99 / 800 J75A-10	4 4 02m/2i
total U	
1. Completeness	
<ol> <li>1.1 Completeness Checklist (Complete that attach).</li> </ol>	e appropriate checklist for each analysis type and
2. Calibration	
2.1 Initial Calibration	m · ^
Was instrument calibrated within specific	ed time period or annually? (YNNA) COMMENT (1)
If NO, qualify all associated data as unus	able (R).
Was each detector used for the associated	d data calibrated? (Y/N/NA)
If NO, qualify all associated data as unus	sable (R).
Are calibration standards NIST traceable	or equivalent? (Y/N/NA)
If NO, qualify all associated data as unus	sable (R).
Were calibration standards expired?(Y/N	(NA)
If YES, qualify all associated data as unu	sable (R).
Comments/Qualified Results:	
(1) Calibration, detentor i	identification, Standards
	toundard integrity information
is not available wit	h this data parkage. All
mudide results are	rejected until dota is made
available-	
All data conditional	ly regeted since (65,
Mes/MSD, belande	· desse wenter
	1/25/25

	2.2 Continuing Campration
	Is check source identified by activity and radionuclides? (Y/NA) COMMENT ()
	If NO, qualify all associated data as estimated (1).
	Has check source been counted daily? (Y/N/NA)
	If NO, qualify all associated data as unusable (R).
	Are check source counts within ±3S control limits? (Y/N/NA)
	If NO, qualify all associated data as unusable (R).
	Have background counts been performed at least weekly and before and after all field and
	QC samples associated with the SDG? (Y/N/NA)
	If NO, qualify all associated results as unusable (R).
	Are background counts within ±3S control limits? (Y/N/NA)
	If NO, qualify all associated results as unusable (R).
	Comments/Qualified Results:
<b>~</b>	
t \ -	Check source and background count data is not ovarlable
	(see p 1)
	- less
	1/2-c/er-
	·

3. Blanks
Have reagent/method/field blanks been analyzed with the SDG? (YNA) COVAMENT (
If NO, qualify all results >LLD as estimated (J).
Are positive results reported in the reagent/method/field blanks? (Y/N/NA)
If YES, qualify positive results less than the MDA as nondetects (U). Qualify sample results
<10X the blank value but greater than the MDA as estimated (j).
Can blank results be verified/calculated properly? (Y/N/NA):
Comments/Notes/Qualified Results:
·
1) The following nuclides show no documentation of
a method blank being analyzed with the Ramples
CS-137 For Samples BOOT75 and BOOJ76.
Th-234 11 11 11 11 11 11
•

ı	4. Detection Limits and Sample Results
	Can LLDs and MDAs be verified? (YNNA) COMMENT ()
	If NO, qualify all results as estimated detects (J) or estimated nondetects (UJ).
	Do reported results meet the detection limit requirements? (YNNA) COMMENT (2)
	Note discrepancies in the validation report narrative under representativeness.
	Can reported results be verified? (YNNA) COMMENT S
	If NO, note missing data in the validation report. Correct results on the photocopied report
	forms and include in the validation report.
	Comments/Notes/Qualified Results:
10513	1 mDAS . LLDs are not provided
EV 100 (E)	grs & results are positive and exceed the detect limits
-	Grs A
)	TC 99
[-	·
	Sr 40
1	
	D.1 538
- 1	D., 239
(	
	GAMMA
Ψ	ORMINA
E	Prisitive results are reported for girss alpha but below
رد	
	De determined. Same for Pu-239 result for BOOJES BOOJE
	DE Water willette Tome 1111 En-524 Learne 400 DOUTE A D'OT LE
6	Rawdota is not available and results cannot be
(8,	
	uprified.
	<u></u>

Comments/Notes/Qualified Results:  Newical yields and tracer recovery informat	\ - /	/tracors/c		ields : analyzed ir	and SDC and	l/or cample as app	ronria
FNO or if inappropriate tracers were used qualify associated results as unusable (R).  Vas a field blank used for the spike/tracer/chemical yield analysis? (Y/NA)  FYES, note in the validation narrative.  So spike/tracer/chemical yield recovery within the limits of 30-105% for sample results pike activity? (Y/NA)  COMMENT (I)  Verify the spike recoveries and qualify associated results as follows: COMMENT (E)  FRE: <30% 30-105% >105% >115%  SELLD R acceptable UJ R  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/Notes/Qualified Results:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  COMMENTS/NOTES/QUALIFIED FOLLOWS:  CO					. ~	voi sample as app	iobiia
Vas a field blank used for the spike/tracer/chemical yield analysis? (Y/QNA)  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation narrative.  If YES, note in the validation sample results as follows: Of Young the validation of the spike recovery without the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of the validation of	_					recults as unusabl	a (P)
FYES, note in the validation narrative.  Is spike/tracer/chemical yield recovery within the limits of 30-105% for sample results pike activity? (Y/D/NA) CAMMENT (I)  Verify the spike recoveries and qualify associated results as follows: COMMENT (E)  FOR: <30% 30-105% >105% >115%  FILLD R acceptable UJ R  FILLD R acceptable UJ R  FORMICAL YIELDS AND TYACET VECTORRY INTO MATTON OF PROVIDED AND THE YOW DATA IS INISSING. WHO CALCULATE.  CHARLES B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gress B. JULT  Gr						•	e (IV).
s spike/tracer/chemical yield recovery within the limits of 30-105% for sample results pike activity? (Y/QNA) CAMMENT (I)  Verify the spike recoveries and qualify associated results as follows: Comment (E)  6R: <30% 30-105% >105% >115%  **CLLD R acceptable UJ R  **CLLD R acceptable UJ R  **CLLD R acceptable J R  Comments/Notes/Qualified Results:  Chemical yields and tracer recovery information for provided and the raw data is missing. W  to Calculate.  Qualified Results as follows: BONT35 ROC  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99					micar yield alla	19313: (1/19/14/1)	-
pike activity? (Y/N/NA) CAMMENT (1)  Verify the spike recoveries and qualify associated results as follows: Comment (E)  6R: <30% 30-105% >105% >115%  **LLD R acceptable UJ R  **LLD R acceptable J R  Comments/Notes/Qualified Results:  Nemical vields and tracer recovery information of provided and the raw data is missing, vields and the raw data is missing, vields and the raw data is missing, vields and the raw data is missing, vields and the raw data is missing, vields and the raw data is missing, vields and the raw data is missing, vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and the raw data is missing. Vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields and vields a	-				ha limits of 20-1	105% for sample re	enite
Verify the spike recoveries and qualify associated results as follows: Common to ER: <30% 30-105% >105% >115%  ELLD R acceptable UJ R  Comments/Notes/Qualified Results:  Nemical yields and tracer recovery information for provided and the raw data is missing. We to Calculate.  Qualified Results of follows: BOOJES BOO To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 99  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90  To 90	-	<u>a</u>	•		ite mints of 50	10570 for sample re	Julis
See Accuracy and Prenision Table on follows:  See Accuracy and Prenision Table on follows:  See Accuracy and Prenision Table on follows:					ted results as fo	ollows:	L 6
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FILENAME: MS-K25.WK1

		SAMPLE	RPT	MS	MSD		MS	MSD	
ANLYS.	HEIS#	RESULT	Rslt	Ralt	Ralt	SPK	%REC.	%REC.	RPD
TC-99	B00J75	0.00	-1.54	337	327	301	112	109	3
SR-90	B00J75	1.31	1.31	21300	18200	24228	88	75	16
GR-A	B00J75	1.26	1.26	1400	1520	1628	86	93	8
GR-B	B00J75	5.97	5.97	1790	1840	1628	110	113	3
Cs-137	B00J75	2.93	2.93	NA	NA	NA	NA	NA	NA
Pu-238	B00J75	0.0258	0.0258	0.135	0.173	NA	NA	NA	25
Pu-238/239	B00J75	-0.0258	-0.0258	11.00	11.20	12.79	86	88	2
tot-U	B00J75	0.37	0.366	35.5	37.9	40.56	87	93	7

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6. Duplicate Samples and Analyses								
Has at least one duplicate analysis been performed for every								
10 samples in the SDG? (Y/N/NA)								
If NO, qualify all associated results as estimated (1).								
Has the field blank been used for duplicate or MS/MSD analysis? (Y/N/NA)  Are RPD valus ≤35% for results >5X the LLD and within ±2X the LLD for results <5X the								
If NO, qualify associated results <lld (uj)="" all="" and="" as="" associated="" estimated="" nondetects="" results<="" th=""></lld>								
>LLD as estimated detects (j).	<b>_</b>							
Comments/Notes/Qualified Results: 1-18-93								
D See Summary of RPD on Accuracy & Precision								
Table of Report. 01-18-93								
•								
•								

7. Laboratory Contr				A 5	_	
Are LCS results with	in the c	ontrol limits	of 80-120% (	Y/N/NA):	<del>Pota Belou</del>	<u> </u>
If NO, qualify results						
%R:	<50%	50-79%	>120%			
Results < LLD: Results > LLD:	R R	UJ J	R R	<b>.</b>		
Has at least one LCS	been a	nalyzed with	the SDG? (Y	(/N/NA):	'	
If NO, qualify all ass	ociated	results as es	timated (J).			
Comments/Notes/Qu	alified l	Results:				
		<u> </u>	ralitier			
915 x	1035	?o			-	
<u> 11                                  </u>	1269	· · · · · · · · · · · · · · · · · · ·	R			· <u></u>
CS-137	99.3	(S ^C	/	(Detect	tor#3)	
16	99.9	د کرد	v	( 11	# ( )	
Pu-238	78.4	1%	In/I			
Pu-739	78.	15%	2/112	·		•
Sr-90	47	Cį	R			<del></del>
Tot. U	98	5 જ <u>ુ</u>	<u></u>			
Tc-99	103	C/0			<del></del>	<u></u>
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Have all samples/analyse	1 /	4	180 days, which	ever comes				
(5)	()							
·	If NO, qualify all associated results >LLD as estimated detects (J) and all associated results <lld (="" (uj).="" as="" estimated="" exceedances="" for="" gross="" non-detects="">2X criteria) qualify all</lld>							
	_	ross exceedances (>2	X cntena) quali	гу ап				
associated results as unu	* *							
Comments/Notes/Qualifices	4-1-91	Analyzzo.	Dove	Qualitier				
S-0-13		Musiyaca		<u> </u>				
A1-18-43 -4-1-91-				=				
Grass X	4-1-91	6-10-91	71	None				
er B		6-10-91	71					
Strontmint 90		5-29-91	59					
To-90		6-6-91	67					
(,2-133		6-6-91						
Plutonium		6-6-91						
Total U	<b>√</b>	4-28-91	27	V				
700J7 <u>6</u>			t					
gress x	4-1-91	lo-10	Same	None				
/ <u>b</u>		6-10	as.					
50-90		5-29	above_					
<u>Ta-99</u>		6-6						
(8-133		)		/				
Pu /238-239		Α .		(				
Total U		4-28	/	4				
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Mid point cou	int times	not previo	del.	·				
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8. Holding Times

9.1 Gas Proportional Counters						
Are field and QC sample preparations outside the range of the self absorption curves?						
(MN/NA): Comment (1)						
If YES, qualify all associated data as estimated (J).						
Are initial detector efficiencies <20%? (Y/N/NA):						
If YES, qualify all associated data as unusable (R).  Have statistical tests been performed routinely (at least weekly)? (Y/NA);						
Have stability verifications been performed after each gas change? (Y/N/NA):						
If NO, qualify all associated data as estimated (J).						
Comments/Notes/Qualified Results:						
C Gas proportional QC onteria was not provided						
•						

9. Method Specific and Other Quality Control

9.2 Alpha Spectros						
Has detector system	n been ca	dibrated acros	s the ene	rgy range of inte	rest? (Y/N	(NA):
If NO, qualify all n	esults as 1	unusable (R).				
Is detector resolution	on <b>ad</b> equ	ate to identify	each pea	k centroid? (Y/N	(NA)}	:
If NO or if resoluti	on canno	t be determin	ed, qualif	y all results as ur	usable (R	).
Is resolution at leas	st 20 keV	FWHM? (Y/N	VNA);			
If NO, qualify all re	esults as e	estimated (J).				•
Do check source ef	ficiencies	agree within	5% of ini	tial calibration eff	iciencies c	or are they
within the control	limits or	±3S of the me	ean? (Y/N	/\(\A\):		
If NO, qualify all a	ssociated	results as un	usable (R)			
Was each sample s	piked wi	th a tracer? (Y	/N/NA):_			
If NO, qualify all a	ssociated	results as un	usable (R)	) <b>.</b>	<b>~</b> )	•
Are tracer recoverie	es within	the control li	mits of 30	to 105%? (Y/N/)	(A):	·
If NO, qualify all re	esults as :	follows:		Ç.		•
%R:	<30%	30-105%	>105%	>115%		
Results < LLD: Results > LLD:	R R	acceptable acceptable	UJ J	R R		
Comments/Notes/Q	Qualified 1	Results:				·
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9.3 Gamma Spectroscopy  Does efficiency calibration approximate a smooth semi-log curve? (Y/N/NA):  If NO, qualify all results as unusable (R).  Have geometry or matrix factors been accounted for in all analyses? (Y/N/NA):  If NO, qualify all associated results as unusable (R).  Does the detector calibration cover the energy range of interest and at least												
						0 to 2 MeV? (Y/N/NA):						
						If NO, qualify all results outside the energy range as unusable (R).						
						Is resolution of the detector system adequate and less than 5 FWHM? (Y/N/NA):						
						If NO, qualify all results as estimated (I).	ı					
						Comments/Notes/Qualified Results:						
1) Gamma Spect. QC criteria was not provide	<u> </u>											
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9.4 Alpha Emitting	Kadium	isotopes			
Have single radium	isotope:	s (Ra-223, Ra	-224, Ra-226) bee	n reported? (Y/N/N	٧A):
If YES, qualify all re	esults att	ributed to a	single radium is	otope as estimated	(J) if the
contribution to the	total from	m individual	isotopes is unkr	nown.	
Can time from sam				/	
If NO, qualify all as			_	/	
Have barium interf	erences b	een identifi	ed and accounted	d for? (Y/N/NA):	
If NO, qualify all as				,	i ().
Has counting efficient			,	<i>(</i>	
If NO, qualify all as				•	
Have blanks been a				r possible radium c	ontamination in
the reagents? (Y/N/				•	
If NO, qualify all as	sociated	results as es	stimated (J).		
Are LCS recoveries				(Y/N/NA):	
If no, qualify sampl				, , , , , , , , , , , , , , , , , , , ,	,
%R:	<50%	50-69%	70-130%	<u>&gt;130%</u>	,
Results <mda Results &gt;MDA</mda 	R R	UJ J	Acceptable Acceptable	R R	
If sample was prese	erved at	collection ha	-	completed within 1	80 days or 5 half-
lives? (Y/N/NA):	·	·	<del>-</del>	•	
If NO, qualify result detects (UJ).	lts >LLD	as estimate	d detects (J) and	results < LLD as e	estimated non-
If samples were not	t nrasom:	ed ware sar	nnlos rossirad su	ishin 5 Januaré	
sampling? (Y/N/NA		ca, were sur	ilpies leceived w	Idilli 5 days of	
	· — –	nreserved	at the laborators	upon receipt? (Y/N	JATAN.
			1	at least 16 days? (Y	
If NO, to any of the			1		
Comments/Notes/Q			Liated sample res	uns as estimated (	) <b>).</b>
Comments/140tes/Q	uamieu .	ivesuits	/ ^	wzed	
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9.5 Radium 226 Analysis using Scintillation (Lucas) Cell Counting
Is calibration data present and can it be associated with the samples? (Y/N/NA):
If NO, qualify associated sample results as unusable (R).
Was the counting system calibrated each day that samples were analyzed? (Y/N/NA):
If NO, qualify associated results as estimated (j).
Was the counting system calibrated after replacing the scintillation cell? (Y/N/NA):
If NO, qualify associated results as estimated (), if the cell has a previously determined
calibration constant and unusable (R) if no constant is available for the replacement cell.
Were blanks analyzed with each sample group to check for radium contamination
in reagents? (Y/N/NA):
If NO, qualify associated results as estimated ().
If sample was preserved at collection has analysis been completed within 180 days or 5 half-
lives? (Y/N/NA):
If NO, qualify results >LLD as estimated detects (I) and results < LLD as estimated non-
detects (UJ).
If samples were not preserved, were samples received within 5 days of
sampling? (Y/N/NA):
Were samples preserved at the laboratory upon receipt? (Y/N/NA):
Were samples held after preservation for at least 16 days? (Y/N/NA):
If NO, to any of the above, qualify associated sample results as estimated (J).
Comments/Notes/Qualified Results:
Not Analyzed
1-18-93
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9.6 Tritium Analysis by Liquid Scintillation Counting
Do calibration standard matrices match the sample matrices? (Y/N/NA):
If NO, qualify associated results as estimated (J).
Has at least one calibration standard been processed with the samples (Y/N/NA):
If NO, qualify results associated with runs lacking calibration standards as unusable (R).
Have results for counting efficiency determination been provided? (Y/N/NA):
If NO, qualify all associated results as unusable (R).
Do tritium levels in the blanks exceed the MDA? (Y/N/NA):
If YES, qualify associated results less than 10X the background tritium level (blanks) as
estimated (J).
Have blanks been analyzed with each sample run to check for potential contamination in the
chemical reagents? (Y/N/NA):
If NO, qualify associated results as estimated (j).
Comments/Notes/Qualified Results:
Not Analyzed to 1-18-93
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	Fluorometric Analysis of Oranium
	as the laboratory provided evidence that cation and anion interferences are negligible for
th	e matrix or that matrix interferences have been accounted for? (Y/NA):
If	NO, qualify associated results as estimated (J).
H	as the laboratory provided a description of the method of fusion standardization or
рī	ovided data supporting fusion standardization? (Y/N/NA):
If	NO, qualify associated results as estimated (J).
W	as calibration performed immediately prior to sample analysis? (Y/N/NA):
	NO, qualify associated results as estimated (I).
C	omments/Notes/Qualified Results:
I	tholysis OC criteria was not provided and methodescription is not available.
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Comments/Notes/Qualified Results:	
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## GAS PROPORTIONAL COUNTERS LOW BACKGROUND BETA COUNTERS

Data Package ID: BOOJ75A
Analysis: $grs \propto B$ , $Tc-99$ $Sr-90$
A.0 Completeness Checklist
Analysis Results  Results Report for Sample Analyses and Reanalyses Raw Data (Counting Logs, Printouts, Notebook Pages)  Calculation Sheets Sample Identifications Detector Identification Analysis Date and Initials of Analyst Amounts of Samples Prepared or Counted Weights of Solids Counted
Initial and Continuing Calibration
Detector Identification  Calibration Date(s) and Initials of Analyst  Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity  Amount of Check Standard Used Raw Data including Counts and Count Duration for Standards Weights of Preparations  Efficiencies  Weights of Carriers Added, If Applicable Results of Statistical Tests Used to Evaluate Instrument Reliability and Efficiency Checks  Raw Data of Background Counts and Count Duration  Results of Statistical Test Used to Evaluate Instrument Background Control Limits fo Check Source and Background Counts
Blanks
Detector Identification Date of Analysis MDA of Method Amounts of Reagents Used in Blank
Radiometric and Gravimetric Yields
Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used Weights of Precipitates or Solids Counted Calculated Recoveries

Detector Identification  Date of Analysis  Aliquots of Samples  Weights of Solids Counted  Count Durations  Sample Identifications  Calculated Precision  Laboratory Control Samples  Detector Identification  Date of Analysis  Calculation of Recoveries  Results of Analyses
Comments/Qualified, Results:
luctide Conditions
Not Used. # 1-18-93
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<u>Duplicates</u>

E2-10-93 ALPHA SPECTROSCOPY Data Package ID:___ Analysis: **B.0** Completeness Checklist **Analysis Results** Results Report for Sample Analyses and Reanalyses Raw Data (Spectra, Printouts, Notebook Pages) Calculation Sheets Sample Identifications Detector Identification Analysis Date and Initials of Analyst Amounts of Samples Counted (Precipitated or Deposited) Initial and Contiuing Calibration **Detector Identification** Calibration Date(s) and Initials of Analyst Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity Amount of (Check) Standard Used Raw Data including Spectra or Counts per Channel Kev/channel Count Duration for Standards **Efficiencies** Raw Data of Background Counts, Dates Counted, and Duration of Counts **Blanks** Detector Identification Date of Analysis MDA of Method Amounts of Reagents Used in Blank <u>Duplicates</u> Detector Identification Date of Analysis Amounts of Samples Counted **Count Durations** Sample Identifications Calculated Precision Radiometric and Gravimetric Yields Amounts (Volumes, Concentrations, Activity) or Spikes, Tracers, or Carriers Used NIST Traceability of Spikes, Tracers or Carriers Weights of Precipitates or Solids Counted

Calculated Recoveries

Laboratory Control Samples				
Detector Identification Date of Analysis Calculation of Recoveries Results of Analyses				
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Comments/Qualified Results:	······································		,	<del></del>
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### GAMMA SPECTROSCOPY

Data Package ID: VSCX) T75
C.0 Completeness Checklist
C.0 Completeness Checklist  Analysis Results  Results Report for Sample Analyses and Reanalyses  N/A - Not  Results Report for Sample Analyses and Reanalyses
Results Report for Sample Analyses and Reanalyses Raw Data (Spectra, Printouts of Counts per Channel, Notebook Pages)  Calculation Sheets Sample Identifications  OK  Detector Identification and Counting Position  Analysis Date and Initials of Analyst  Amounts of Samples Counted
Initial and Continuing Calibration
Detector Identification  Calibration Date(s) and Initials of Analyst  Identification of Calibration and Check Standards including Radionuclides, Certification, Expiration Date, and Activity  Amount of (Check) Standard Used  Raw Data including Counts and Count Duration for Standards  Efficiencies and/or Geometry and Matrix Factors  Raw Data of Background Counts, Count Dates, and Duration of Counts  KeV/Channel  FWHM
<u>Blanks</u>
Detector Identification  Date of Analysis  MDA of Method  Amounts of Reagents Used in Blank  Raw Data
<u>Duplicates</u>
Detector Identification  Date of Analysis  Amounts of Samples  Count Durations  Sample Identifications  Results of Analyses and Calculated Precision  Raw Data
Radiometric and Gravimetric Yields
Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers or Carriers Used  Weights of Precipitates or Solids Counted  Calculated Recoveries

Laboratory Control Samples			
Detector Identification			
Date of Analysis  Calculation of Recoveries			
Results of Analyses	•		
Comments/Qualified Results:			
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# ALPHA EMITTING RADIUM ISOTOPES USING SCINTILLATION COUNTING

Data :	Package ID:		Not Used.
Analy	/sis:		
D.0 C	Completeness Checklist	. /	K1-18-93
Analy	vsis Results		6110
Initial	Results Report for Sample Analyses and Raw Data (Gross Counts, Count Duration Duration Calculation Sheets Sample Identifications Detector Identification and Counting Pre Analysis Date and Analyst Initials Sample Weight  and Continuing Instrument Calibration  Detector Identification Calibration Dates and Analyst Initials Identification of Calibration Standards in Expiration Date and Activity Amount of Standard Used for Calibration Raw Data (Gross Counts, Count Duration Duration) Routine Control Charts	on, Background Count ecision ncluding Radionuclide	es, Certification, Issue or
Blank	<u>s</u>		
	Detector Identification Date of Analysis MDA of Method Amounts of Reagents Used Lot Numbers of Reagents Used Raw Data (Gross Counts, Count Duratio Duration)	n, Background Count	t, and Background Count
Dupli	<u>cates</u>		·
	Detector Identification Date of Analysis Sample Weight Amount of Spike for Spiked Duplicates Raw Data (Gross Counts, Count Duratio Count Duration)	n, Background Count	s, and Background

Radiometric and Gravimetric Yields
Amount of Spike Used for Spiked Samples Amount of Radium Standard Used for Radiometric Yield Determination NIST Certification for Radium Standards Calculated Radiometric Yield Weight of Carrier Added for Gravimetric Determination Weight of Carrier Recovered for Gravimetric Determination Calculated Gravimetric Yields
Laboratory Control Samples
Sample Identification Detector Identification Date of Analysis Calculated Recoveries Results of Analyses Sample Weight
Comments/Qualified Results:
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## RADIUM-226 ANALYSIS USING SCINTILLATION (LUCAS) CELL COUNTING

Not Used

Data Pa	ckage ID:			
E.0 Cor	npleteness Checklist		P8 1-	18-93
Analysis	Results /	'		
F	Results Reports for Sample Analyses and Reanalyses Raw Data (Gross Counts, Count Duration, Background Co Duration) Calculation Sheets Sample Identifications Scintillation (Lucas) Cell Identification Analysis Date and Analyst Initials Amounts of Samples Counted Sample Weight or Volume and Continuing Instrument Calibration	ount, and	Backgrour	ıd Count
<u>Initial ar</u>	nd Continuing Instrument Calibration		_	
I	Scintillation (Lucas) Cell Identification Calibration Dates and Analyst Initials dentification of Calibration Standards Including Radionuc Expiration Date and Activity Amount of Standard Used for Calibration Rad Data (Gross Counts, Count Duration, Background Co Duration Routine Control Charts			
<u>Blanks</u>			-	
I	Scintillation (Lucas) Cell Identification Date of Analysis MDA of Method Amounts of Reagents Used Lot Numbers of Reagents Used Raw Data (Gross Counts, Count Duration, Background Co	ounts, and	Backgrou	nd
Duplicat	tes .			•
	Scintillation (Lucas) Cell Identification Date of Analysis Sample Weight Amount of Spike for Spiked Duplicates Raw Data (Gross Counts, Count Duration, Background Co Count Duration)	ounts, and	Backgrou	nd

Radiometric and Gravimetric Yields	
Amount of Spike Used for Spiked Samples Weight of Carrier Added for Gravimetric Determination Weight of Carrier Recovered for Gravimetric Determination Calculated Gravimetric Yields	
Laboratory Control Samples	
Sample Identification Scintillation (Lucas) Cell Identification Date of Analysis Calculated Recoveries Results of Analyses	
Comments/Qualified Results:	_
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TRITIUM ANALYSIS USING
LIQUID SCINTILLATION COUNTING

Data Packa	ge ID:	NOT VISCON
F.0 Compl	eteness Checklist	NOT VISCO
Analysis Re	<u>esults</u>	(B175.13
Rav	ults Report for Sample Analyses and Reanalyses v Data (Gross Counts, Count Duration, Background Coration) culation Sheets uple Identifications crument Identification ulysis Date and Analyst Initials uple Weight	ount, and Background Count
Initial and	Continuing Instrument Calibration	
Ider Exp Raw Dur Cou	rument Identification ntification of Calibration Standards including Radionuc iration Date and Activity v Data (Gross Counts, Count Duration, Background Co ration) inting Efficiency Determination Method and Results ench Correction Method	
<u>Blanks</u>		
Kaw Dur	rument Identification e of Analysis A of Method ounts of Reagents Used Numbers of Reagents Used v Data (Gross Counts, Count Duration, Background Coration) ium Levels in Background Water	ount, Background Count
<u>Duplicates</u>		
Date Ame	rument Identification e of Analysis ounts of Samples ount of Spike for Spiked Duplicates v Data (Gross Counts, Count Duration, Background Co int Duration)	ounts, and Background

### FLUOROMETRIC ANALYSIS OF URANIUM

Data F	Package ID:	300J75	
G.0 C	Completeness Checklist		V-V05
Analys	sis Results	•	V-Yes
	Results Report for Sample Analyses Raw Data (Fluorometer Readings, No Calculation Sheets Sample Identifications Instrument Identification Analysis Date and Analyst Initials Sample Weight		
<u>Initial</u>	and Continuing Instrument Calibration	<u>on</u>	
× × × · · ·	Instrument Identification Calibration Dates and Analyse Initial Identification of Calibration Standard Concentration Amount of Standards Used for Calib Raw Data (Fluorometer Readings, No	ds including Certification, Ex	piration Date and
Blanks	<u>s</u>		•
	Instrument Identification Date of Analysis MDA of Method Amounts of Reagents Used Lot Numbers of Reagents Used Raw Data (Fluorometer Readings, No	otebook Pages, etc.)	
Duplic	cates		
X V X X	Instrument Identification  Date of Analysis  Amounts of Samples  Amount of Spike for Spiked Duplica  Raw Data (Fluorometer Readings, No	tes otebook Pages, etc.)	
Gravin	metric Yields		
× ×	Weight of Carrier Added for Gravim Weight of Carrier Recovered for Gra Calculated Gravimetric Yields	etric Determination vimetric Determination	

Laboratory Control Samples				
Sample Identification Instrument Identification				
Date of Analysis				
Date of Analysis  Calculated Recoveries  Results of Analyses		-		
Results of Analyses				
Comments/Qualified Results:				
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Date Printed: 25-FEB-1992 09:27

Customer: KESSNER

Analis ID: 910412-211

Project: G132 0201

Customer Sample ID: BOOJ75

Requisition Number:

Date Sample Received: 6-APR-1991

Sampled By:

Date Sampled: 1-APR-1991

Date Sample Completed: 24-SEP-1991

Date Sample Approved:

Material Description: SOIL

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result <b>Q Q</b> ual	Limit of Error	Units	Analyst	QA File Number	Date Completed
**** Spectro	chemistry Laboratory ***	**				•	
	Selenium	•		ug/Kg	29175	10427A	27-JUN-1991
**** Inducti	ively Coupled Plasma Labo	ratory ****					
EPA-3050	Bismuth	<10.0		mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7				<u> </u>		•	
**** Radioch	memistry Laboratory ****						
EC-134	Cesium-137	2.93 RX	+/- 3.0E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.26	+/- 2.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	5.97 121	+/- 3.9	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.31 R+	+/- 4.6E-1	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
IHA-485	Uranium Alpha Activity	3.66E-1 R+	+/- 2.0E-1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	13.9 -1.54 XUR	+/- 13.9	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.09 2.585-2 X HR	+/- 8.9E-2 R	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-239	0109 -2.585-2 RUR	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	mistry Laboratory *****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA.	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1		ug/g	900019	91-29	20-MAY-1991

#### Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
NITRATE	0	100	99	ug/g	99.	99.0
ORTHO PHOSPHATE IC	0	100	88	ug/g	88.	88.0
SULFATE	0	200	176	ua/a	176.	88.0

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Date Printed: 25-FEB-1992 09:28

AnaLIS ID: 910412-212

Program Manager: DL AMBURGEY (# 28912

Project: G132 0201

Customer Sample ID: 800J76

Customer: KESSNER

Requisition Number:

Date Sampled: 1-APR-1991

Date Sample Received: 6-APR-1991 Date Sample Completed: 24-SEP-1991

Sampled By:

Material Description: SOIL

Date Sample Approved:

[]: Result has been Corrected for Spike

Procedure No.	Analysis	 Result Q Qual	Limit of Error	Units	Analyst	CA File Number	Date Completed
titt Charte	ochemistry Laboratory ***	************					
opecii	Selenium			ug/Kg	29175	10427A	27-JUN-1991
***** Inducti	ively Coupled Plasma Labor	ratory *****					
EPA-3050	Bismuth	<10.0		mg/Kg	EA HESTER	10716B	16-JUL-1991
EPA-200.7							
***** Radioch	nemistry Laboratory *****						
EC-134	Cesium-137	20.22 RX	+/- 8.2E-1	pCi/g	SM KINNEBREW	ENV-534	6-มีมห-1991
EPA-900.0	Alpha Activity	3.27 RX	+/- 2.3	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	27.80 (25/	+/- 5.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.65 RX	+/- 5.4E-1	pCi/g	SM KINNEBREW	ENV-534	29-HAY-1991
IHA-485	Uranium Alpha Activity	4.45E-1 RX		pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	48.10 PM		pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	0.1 0.00 PHR	+/- 1.0E-1 €		SM KINNEBREW	ENV-534	6-JUN-1991
7° 1635	Plutonium-239	0.09 -2.58E-2 KUK	+/- 8.9E-2	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	mistry Laboratory *****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20	,	ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		Ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	<0.1		ug/g	900019	91-29	20-MAY-1991

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AnaLis Reports

Date Printed: 10-FEB-1992 14:23

Analis ID: 910415-089

Sampled By:

Project: G132 0201

Customer Sample ID: BOOJ75-MS

Requisition Number:

Date Sample Received: 6-APR-1991

Date Sample Completed:

Date Sample Approved:

Material Description: SOIL

Customer: KESSNER

Date Sampled: 1-APR-1991

Program Manager: DL AMBURGEY (# 28912

[]: Result has been Corrected for Spike

Procedure No.	Analysis	Result 0 Qua	Limit l of Error	Units	Analyst	QA File Number	Date Completed
***** Spectro	ochemistry Laboratory *****						
	Selenium	******		ug/Kg			
**** Inducti	vely Coupled Plasma Laborator	y ****					
EPA-200.7(CLP)	) Bismuth	NA		ug/Kg	MJ SCHEUER	NA	16-JUL-1991
***** Radioct	memistry Laboratory *****	•					
EC-134	Cesium-137	NA	+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.40E3	+/- 27.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	1.79E3	+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	2.13E4	+/- 35.0	pCi/g	SM KINNEBREW	ENV-534	29-MAY-1991
1HA-485	Uranium Alpha Activity	35,50	+/- 1.9	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technetium	3.37E2	+/- 21.7	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
1635	Plutonium-238	1.35E-1	+/- 1.4E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
635	Plutonium-239	11.00	+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
**** Wet Che	emistry Laboratory *****						
EPA-300.0	Nitrate	88		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Ortho Phosphate IC	. 99		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	176		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide			ug/g	MH FELLER	×	21-APR-1991

***** Comments from the Wet Chemistry Laboratory *****

HS/MSD NOT PREFORMED ON CYANIDE ANALYSIS

***** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.

Date Printed: 10-FEB-1992 14:24

AnaLIS ID: 910415-090

Project: G132 0201

Customer Sample ID: BOOJ75-MSD

Customer: KESSNER

Requisition Number:

Date Sampled: 1-APR-1991

Date Sample Received: 6-APR-1991

Sampled By:

Date Sample Completed:

Material Description: SOIL

Date Sample Approved:

Program Manager: DL AMBURGEY (# 28912

[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result 0 Qua	Limit al of Error	Units	Analyst	QA File Number	Date Completed
***** Spectro	ochemistry Laboratory *****						
	Setenium			ug/Kg			
**** Inducti	ively Coupled Plasma Laborato	: ry *****					_
EPA-200.7(CLP)	) Bismuth	NA		ug/Kg	MJ SCHEUER	NA	16-JUL-1991
***** Radioch	nemistry Laboratory *****						
EC-134	Cesium-137	NA	+/-	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
EPA-900.0	Alpha Activity	1.52E3	+/- 28.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-900.0	Beta Activity	1.84E3	+/- 29.0	pCi/g	SM KINNEBREW	ENV-534	10-JUN-1991
EPA-906.0	Strontium	1.82E4	+/- 33.0	pCi/g	SM KINNEBREW	ENV-534	29-HAY-1991
IHA-485	Uranium Alpha Activity	37.90	+/- 2.1	pCi/g	SM KINNEBREW	ENV-534	28-APR-1991
TP-1628	Technet ium	3.27E2	+/- 21.5	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
TP-1635	Plutonium-238	1.73E-1	+/- 1.5E-1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
635	Plutonium-239	11.20	+/- 1.1	pCi/g	SM KINNEBREW	ENV-534	6-JUN-1991
***** Wet Che	emistry Laboratory *****						
EPA-300.0	Nitrate	<20		ug/g	CA SEDLACEK	91-44 IÅ	21-APR-1991
EPA-300.0	Ortho Phosphate IC	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-300.0	Sulfate	<20		ug/g	CA SEDLACEK	91-44 IA	21-APR-1991
EPA-335.2	Cyanide	x		ug/g	MH FELLER	x	21-APR-1991

***** Comments from the Wet Chemistry Laboratory *****

MS/MSD NOT PERFORMED ON CYANIDE ANALYSIS

***** Comments from the Radiochemistry Laboratory *****

THE SPIKE RECOVERY ON SAMPLE NUMBERS 910145-089MS, 090MSD FOR PLUTONIUM WAS BASED ON THE TOTAL OF PU-238 AND PU-239. ****** Comments from the Inductively Coupled Plasma Laboratory *****

This sample was not chosen to be spiked by the ICP laboratory.